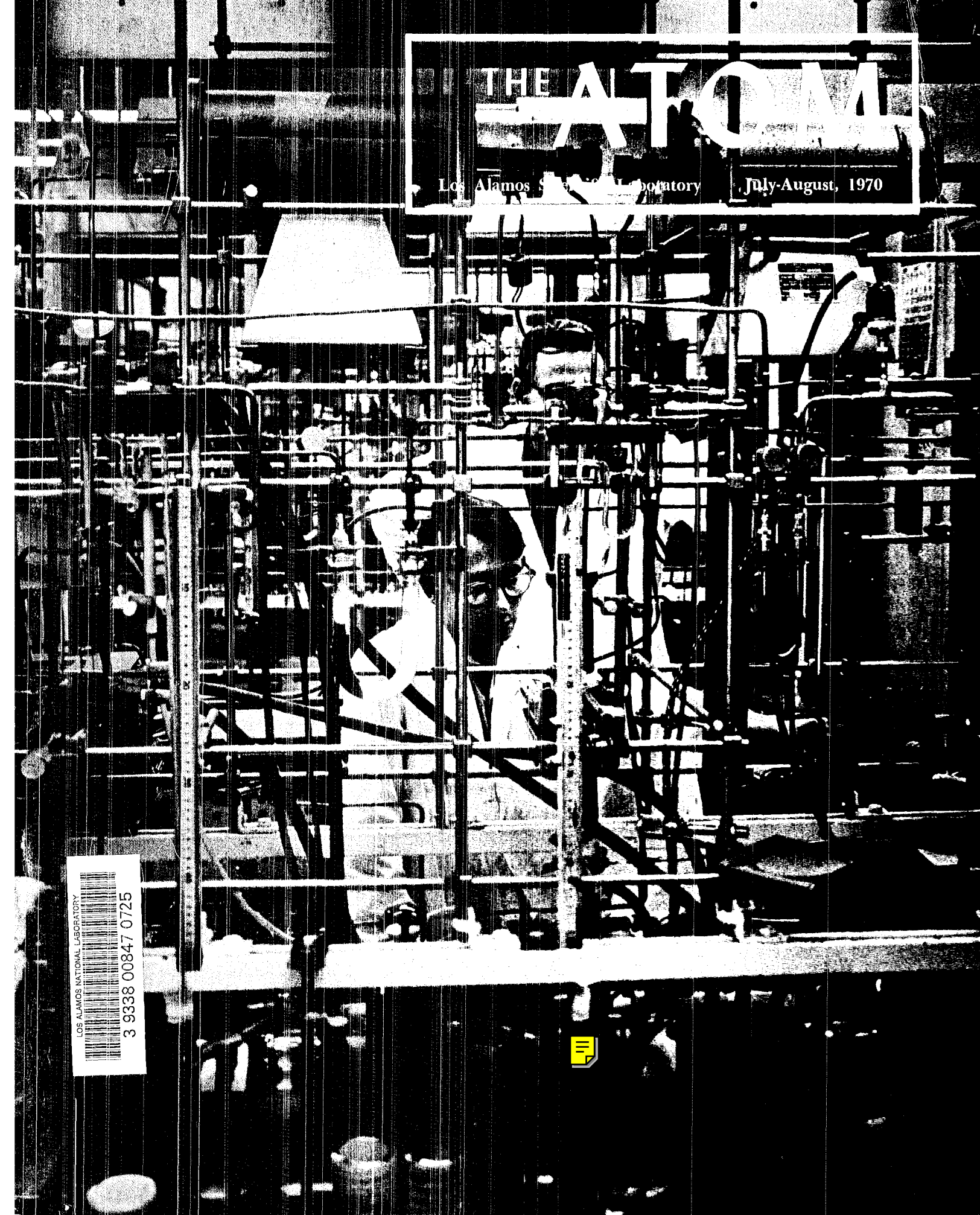


THE ATOM

Los Alamos Scientific Laboratory — July-August, 1970

Volume 7 Number 7
July-August, 1970

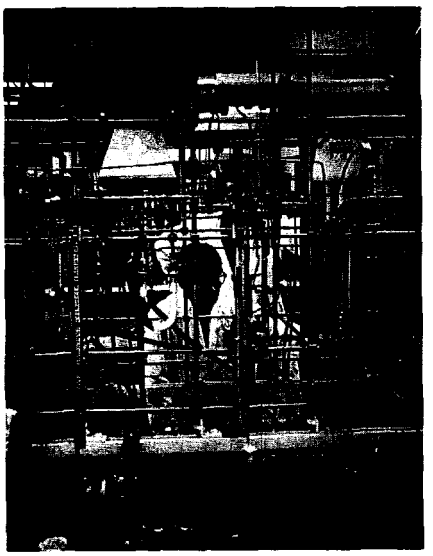
THE ATOM

Published by the University of California, Los Alamos Scientific Laboratory, Office of Public Relations, P. O. Box 1663, Los Alamos, New Mexico 87544. Second Class Postage Paid at Los Alamos.

CONTENTS:

Editor: Kenneth J. Johnson
Photography: Bill Jack Rodgers and Bill Regan

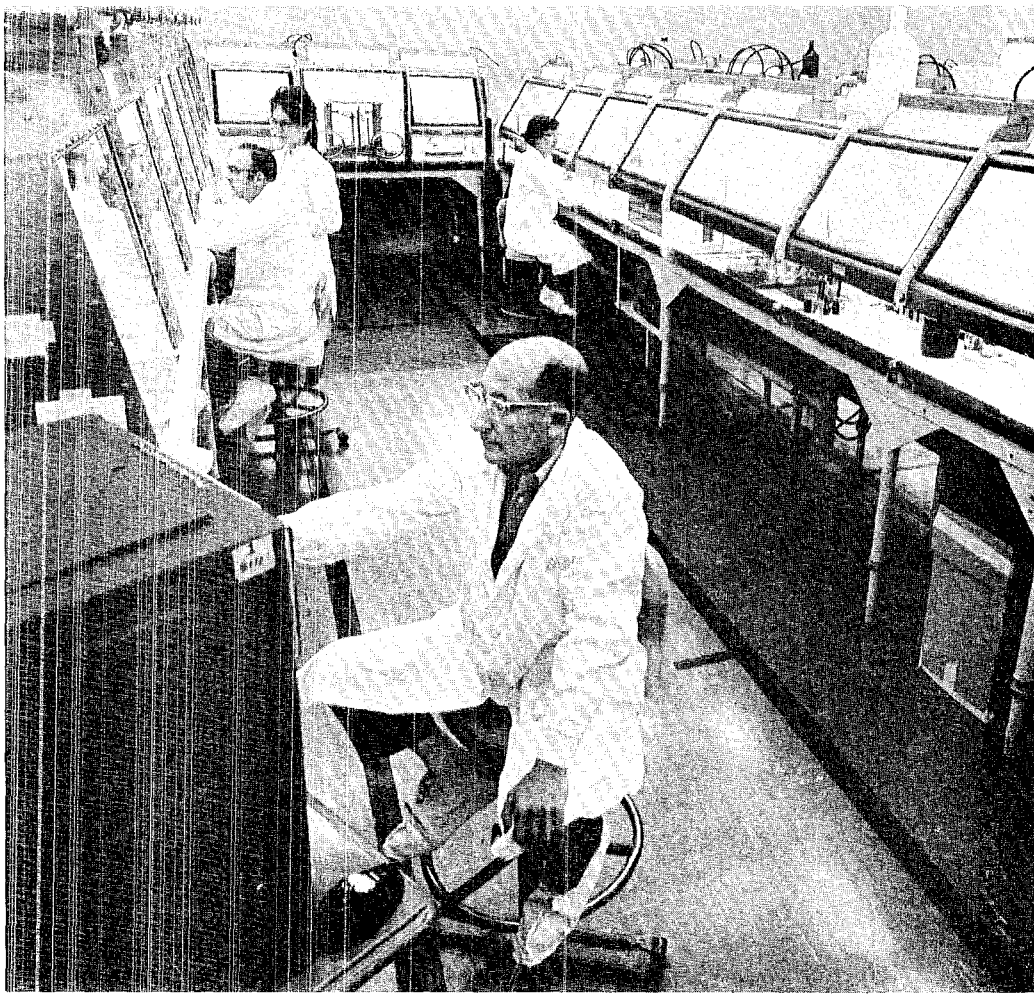
Office: D-413 Administration Building. Telephone: 7-6102. Printed by The University of New Mexico Printing Plant, Albuquerque.



COVER:

The conglomeration of pipes, tubes and other items that appears on the cover of this issue of "The Atom" may look like something taken from a science fiction movie, but it's not. It's an inert gas fusion and combustion apparatus used by CMB-1 in the analysis of materials for carbon and oxygen content within a few parts per million. Its operators are William Hutchinson and Donald Vance. The photograph was taken by PUB-1 Photographer Bill Jack Rodgers.

Working in one of CMB-1's plutonium assay laboratories are Walter Wilson, foreground, Dale Croley and Nancy Koski, and Lorraine Thorn.



They Thumbprint The Elements

If the "four-element" theory conjectured 2,500 years ago was as widely accepted now as it was then, the ingredients of a martini would not be gin and vermouth; bartenders would be putting your olive in a mixture of dirt, water and "hyle."

The four-element theory entertained the idea that all matter was made up of four "elements." These were earth, air, fire and water. The Greek philosopher Aristotle interpreted the theory to mean all matter was made up of a basic substance he called "hyle" (stuff or material) and characteristics of each of the four "elements." He labeled these characteristics hot, cold, dry and moist; air was hot and moist, water was cold and moist, fire was hot and dry, and earth was cold and dry.

Although widely accepted for more than 2,000 years, it is known today that matter cannot be explained in so simple terms. There are more than 100 known elements and many isotopes of these elements. Earth, air, fire, and water are not on the current list.

With modern techniques and instrumentation, analytical chemists can analyze materials for trace amounts of these elements and isotopes with great precision. Putting the word "trace" into perspective, "A fly speck is a colossal mound of manure," said Charles F. Metz, CMB-1 group leader at the Los Alamos Scientific Laboratory.

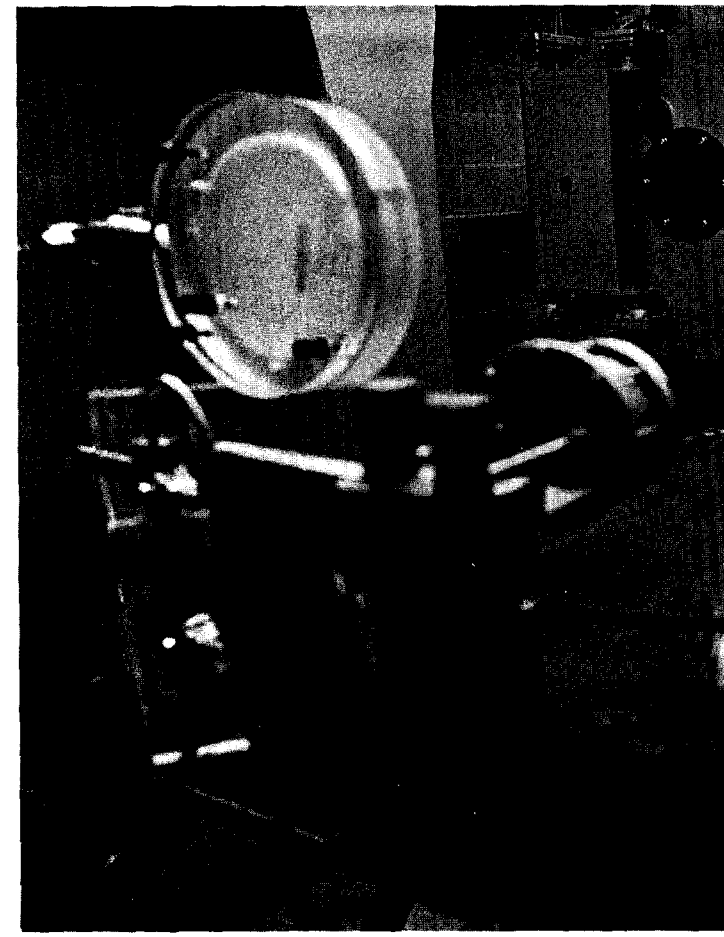
Metz's analytical group supports essentially all technical programs at the Laboratory. Its members analyze inorganic materials that are both fissionable and non-fissionable, radioactive and non-radioactive. They conduct approximately 30,000 analyses each year, about half of which are concerned with weapons-connected materials. Another 7,000 of these involve nuclear reactor fuel elements for the Rover program, America's endeavor to develop a nuclear-propelled rocket capable of interplanetary travel. To a lesser degree CMB-1 is doing analytical work for several other specific projects. These include development of an

continued on next page

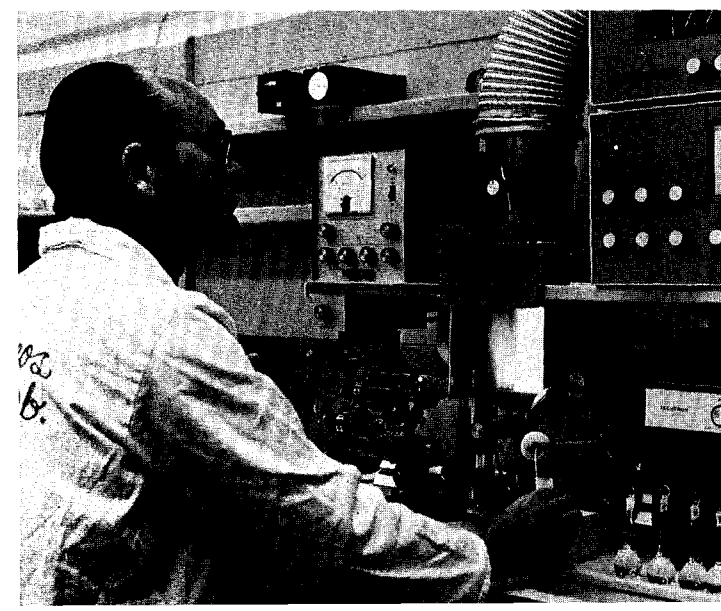
analytical program to assure quality control in the production of fuel elements for the Fast Flux Test Facility (FFTF) which will be built at the AEC's Hanford Works near Richland, Wash. The FFTF is a key tool in the Atomic Energy Commission's program to develop Liquid Metal Fast Breeder Reactors (LMFBR) for eventual use in commercial electrical power systems. The analytical group is assisting in a study of the physical and chemical characteristics of irradiated fuel elements, and is providing analytical support for a program in which ceramic fuels are being developed. A study of the interaction of plutonium-238 heat source capsules and nuclear reactor fuels with the environment, particularly the corrosion effects of surface water, is being done for the Systems for Nuclear Auxiliary Power (SNAP) program. Plutonium-238 power sources, being developed for the SNAP and artificial heart programs are being analyzed by CMB-1, and the group is developing methods to dissolve a large variety of scrap containing plutonium and techniques for rapid analysis of these solutions. In addition to these programs, process solutions such as those derived from plutonium operations at DP site are analyzed on a regular basis to determine the completeness of recycle processes.

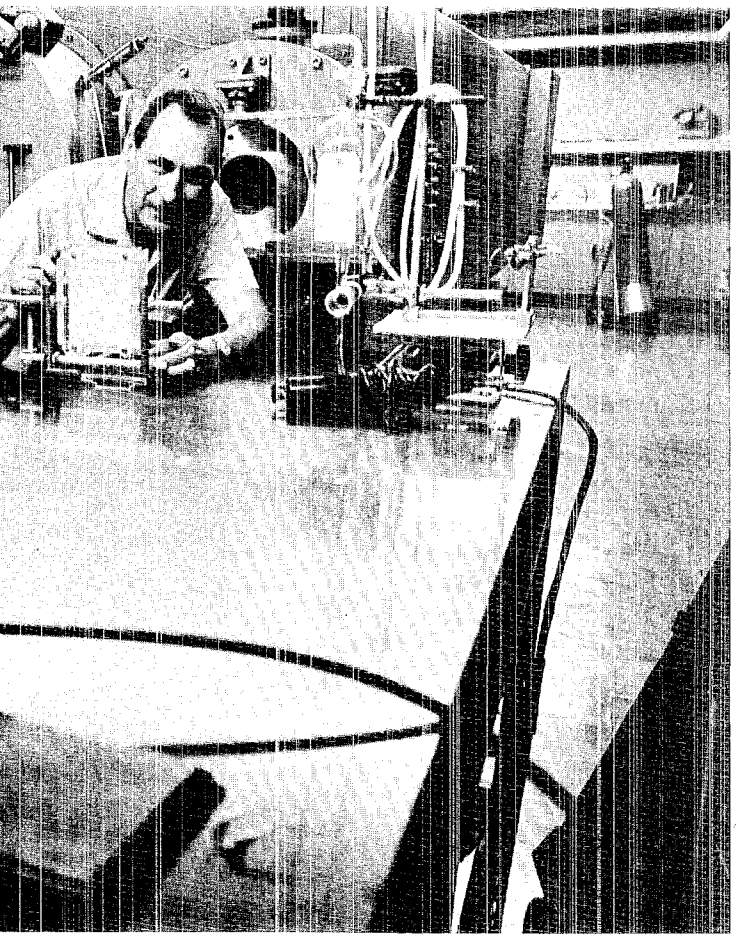
The capabilities and achievements of CMB-1 in the analytical field are nationally and internationally known. One of its most notable successes has been a joint effort with CMB-11 in establishing the primary chemical standard for plutonium for the U.S. Bureau of Standards. Plutonium metal of unmatched purity is made by CMB-11; it is analyzed, weighed accurately as 0.5-gram samples, and sealed in a protective atmosphere by CMB-1 for sale by the Bureau. The standard is recognized all over the world in the nuclear field, Metz said.

The group is also well known in the analytical field for developing a method for determining a few parts per million of carbon and oxygen in metals and refractory materials. "It's done by converting the oxygen or carbon, as the case may be, into carbon dioxide," Metz said. "The carbon dioxide is then separated from other gases by freezing in a capillary trap, using liquid nitrogen as the freezing agent. The frozen carbon dioxide is allowed to warm to room temperature and the volume of the gas is measured in a calibrated capillary manometer. As little as one microgram of carbon or oxygen can be measured with this method. The presence of trace amounts of these impurities significantly affects the physical properties of metals and alloys. Development of this



Above, David Steinhaus adjusts the diffraction grating on a high resolution spectrograph. Upper right, Carolyn MacDougall and Maynard Smith prepare plutonium samples for the U.S. Bureau of Standards. Below, Ross Gardner analyzes a solution using the atomic absorption spectrophotometer.





technique of analysis has been dictated by requirements of people doing research on the physical and chemical properties of high purity metals and alloys."

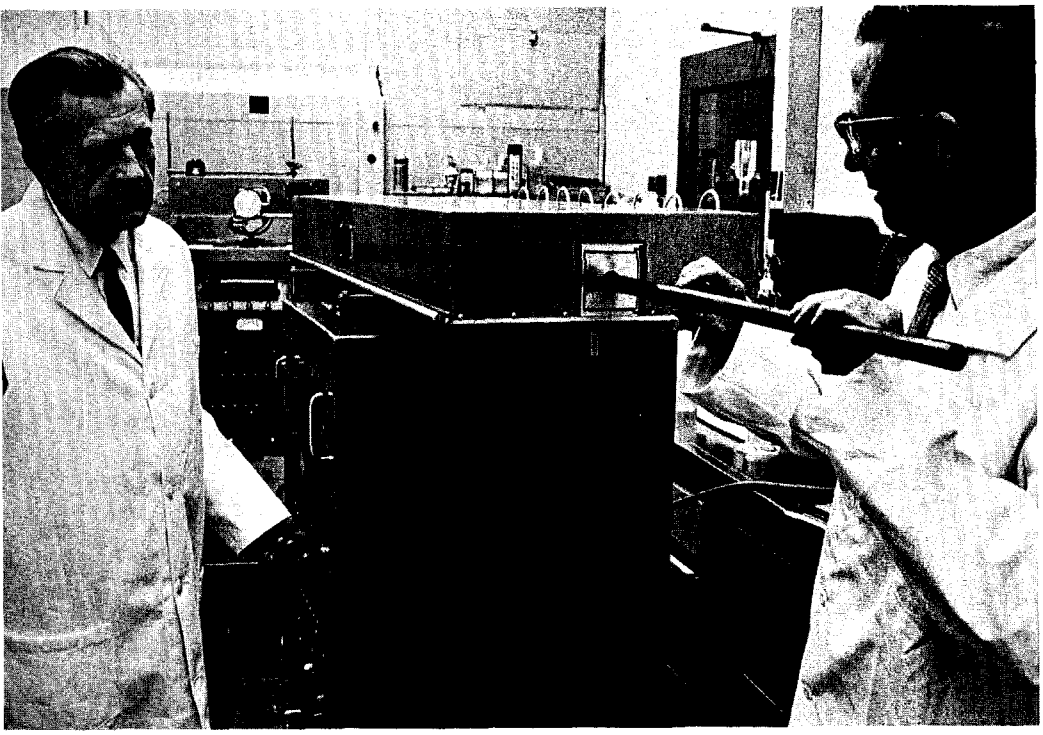
The analytical group is made up of approximately 60 persons. Because of the intricate nature of their work, highly trained and experienced staff members are the backbone of the organization. The staff members, who are mostly chemists, number about 50. Two physicists form the nucleus of the Spectroscopy Research section, the only section whose time is devoted entirely to basic research. This section is making a detailed study of the spectra of uranium isotopes to better understand the structure of uranium atoms.

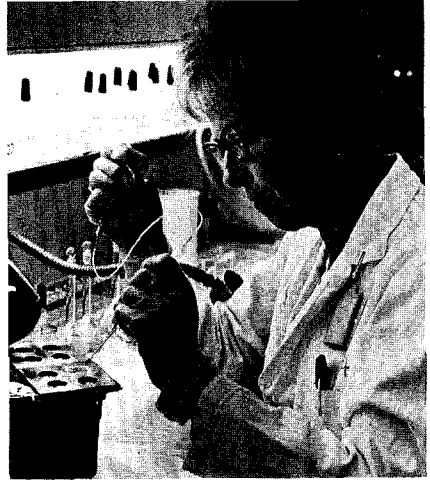
If cast against a background of their industrial counterparts, CMB-1 analysts have an extra dimension. "In an industrial situation an analytical chemist may use the same instrument time and time again to make the same measurements day after day to be sure his company's product is uniform," Metz said. "But, in a research and development laboratory such as we have here, new materials are being developed all the time. The groups that develop them want these materials analyzed in order to better understand their natures. Such analyses require development of analytical methods on our part because appropriate techniques or instrumentation to do this work often times are nonexistent."

The group's responsibilities begin during the planning stages of any program in which analyses will be required. This gives CMB-1 a "feel" for the program and some idea of what materials will be used. Then, while other groups are developing the special materials required for the program, CMB-1 works on the techniques and instrumentation that will be needed for the analyses. These capabilities are continually upgraded during the course of the program.

In the FFTF program, CMB-1, with the aid of C-5, is responsible for developing a statistically designed program of analysis which will assure quality control in the production of fuel elements for the program's Fast Test Reactor (FTR). "The fuel element is a sintered mixed-oxide fuel with a uranium to plutonium ratio of three to one by

continued on next page





Left, Charles Metz, CMB-1 group leader, mans the control panel of the whole element counter while George Matlack inserts a fuel element. Above, Jennie Cooper prepares a sample for analysis by CMB-1's Radio-Chemistry section. Below, James Murphy deciphers spectral lines recorded on film which are indicative of the elements contained in a material being analyzed.

weight," said Metz. "We had to develop a method for measuring plutonium and uranium, preferably while in the presence of each other, so that no possible bias would be introduced by a separation of the two before analyses. Knowing that a technique we call 'controlled potential coulometry' might apply in this case, we developed the details for its application in this program. This is an electrometric technique in which the total current required to oxidize or reduce plutonium and uranium from one oxidation state to another is measured in terms of coulombs (one coulomb is the quantity of electricity transferred by a current of one ampere in one second). As it turned out, we were able to analyze both plutonium and uranium in the presence of each other with adequate precision. In choosing this technique, what we did was draw upon our knowledge of the chemistry of plutonium and uranium.

"In a Rover fuel, N division established specifications for metallic impurities. Since there are a fairly large number of impurity metals, it seemed best to do the analytical work by 'emission spectroscopy.' We needed to know what impurities were present and in what proportions. This method appeared to be the most logical choice." In an emission spectrograph the sample is excited by an electrical discharge. This causes each element present to emit light which is separated into specific wavelengths by a diffraction grating. The extent of separation depends on the grating's total number of lines and lines per inch. The lines usually number 15,000 to 30,000 per inch. Each isotope in the periodic table emits electromagnetic radiation having characteristic wavelengths which can be recorded on a photographic plate or measured electronically.

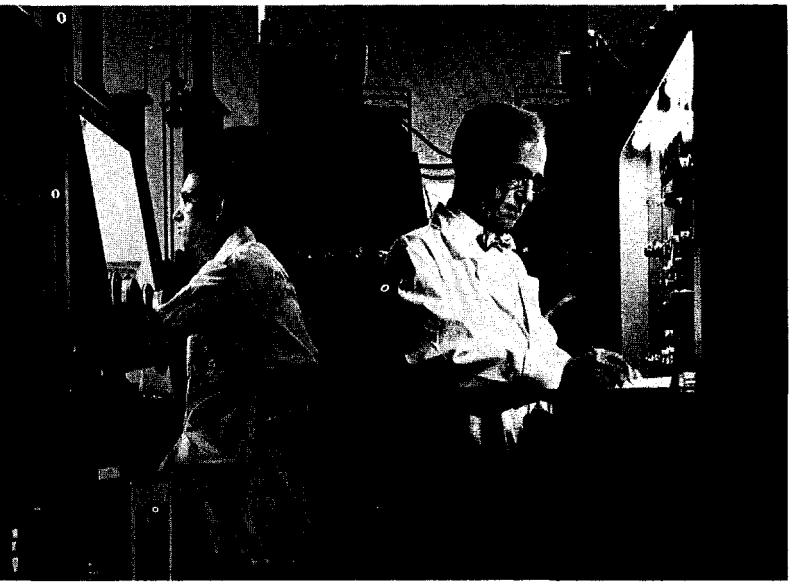
An apparatus called the "whole element counter" is used by CMB-1 to measure the amount of uranium-235 contained in fuel elements being developed for the Rover program. It incorporates a detector system which measures the total flux of

Bertha Rivas records information from alpha counters in CMB-1's Radio-Chemistry section.

the 186 keV gamma rays given off by the uranium-235 in the fuel elements. Working from principles suggested by CMB-1, the apparatus was designed and constructed by CMB-7. "In 10 seconds we can make this measurement and tell how much uranium-235 there is in the element within three-tenths of one per cent standard deviation. It takes longer to put a fuel element in the apparatus and take it out than it does to make the measurement," Metz said.

"To work in a research laboratory such as this," the group leader noted, "an analytical chemist has to be very versatile and dedicated to making measurements. He must have the patience to pay infinite attention to myriad details. A generation ago, the analytical chemist could do all his work with beakers, burettes, burners and balances . . . you'd have to add crucibles to the list too . . . but since the end of World War II, the development

continued on next page



Calvin Martell, left, and Bob Phelps analyze materials with one of CMB-1's emission spectrographs.

of electrical instruments which have applications in analytical chemistry has been so very extensive that a '4-B' analytical chemist is of very little value in a research organization. It is emphasized to each prospective employee that his progress is dependent upon his capability to adapt to the requirements imposed by the constantly changing nature of the analytical responsibilities of the group."

In contrast to the equipment used by the '4-B' chemist a generation ago, CMB-1 analysts use the most modern and sensitive instrumentation found anywhere. In addition to the coulometers, emission spectrographs, gamma counters, and analyzers for measuring carbon and oxygen, other equipment used includes gamma ray spectrometers, gamma scanners, electron microprobes, atomic absorption spectrophotometers, x-ray fluorescence spectrometers, automatic titrators, and various beta and alpha particle counters. In the old art of weighing, very sensitive and accurate instruments are available. Balances, for example, are used that weigh a fraction of a microgram (there are 453 million micrograms in a pound). These microbalances must be placed on heavy concrete tables because they would "sense" any movement of a lighter table. The tables are reinforced with copper because the balances are so sensitive, their operation would be affected by the magnetism induced by the earth's magnetic field if steel were used. Under the legs of the tables are specially designed pads to absorb building vibrations which can also affect the performance of a balance. In some cases, performance can be affected by the heat from an operator's body; a sheet of plastic or glass is placed between the operator and balance in these cases.

Electron microprobes cast a collimated beam of electrons on a flat, polished surface, causing the emission of x rays characteristic of the elements in an area of less than 1/25,000 of an inch in diameter. This leads to identification of the elements present. The technique is so sensitive that as little as 0.000000000001 of a gram of an element can be detected.

An atomic absorption spectrophotometer is used to measure very small concentrations of elements in solutions in the parts-per-million range. Light from hollow cathode tubes provide the standard spectra of specific elements. The light is passed through a flame into which is vaporized the same element in an excited state. Source of the excited element is a solution of the sample which is fed into the flame at a known rate. The flame absorbs certain wavelengths from the element, or elements, in the cathode tube. The amount of absorption depends on the concentration of the element in solution.

These are but some of the ways in which the various elements and isotopes are identified. "Every element and isotope leaves its 'thumbprint' in many different ways," said Metz. "Thumbprints are as individual to them as they are to human beings."

Whatever technique is used to thumbprint a material, cleanliness is a part of it. An unclean laboratory leads to contamination and can result in false readings in the trace analysis of materials. It can also have other serious consequences, such as being a hazard to the health of the people working there. "The people who do the analyses in these laboratories are responsible for keeping them clean, exclusive of normal janitorial services," Metz said. "They keep them as clean as operating rooms in a hospital."

Although the Chemistry and Metallurgy Research (CMR) building was designed to deal with the health hazards associated with handling plutonium, cleanliness is also facilitated. The building has seven wings all interconnected by a 650-foot-long "spinal" corridor. The CMR building is completely air conditioned and has an elaborate ventilation system for each wing. Air is filtered and washed before it enters the laboratories and is filtered again before it is exhausted outside the

building to remove any radioactive contamination. The ventilation system creates a slight "negative" pressure in each of the laboratories. This means that air is drawn into them rather than being released to wing corridors when their doors are opened. This is a safeguard to prevent radioactive materials used in one laboratory from contaminating the rest of a wing. In addition, laboratories in which radioactive materials are handled are on the "inside" half of the wings, and they do not have windows.

Another way of preventing contamination has to do with the judicious assignment of analytical work to specific laboratories. Each one is equipped to function individually so that contamination does not result from carrying materials from one to another during analyses. In many cases, such as with plutonium, contamination control is further facilitated by assembly-line techniques in which all of these processes are linked in an orderly sequence in a series of glove boxes. All steps in the analysis of radioactive materials are carried out in glove boxes, and these materials are not removed except when analytical work is completed and residues are properly packaged and collected for recycle operations.

When a material is submitted to CMB-1 for analysis, it is taken to the sample preparation room where it is weighed and divided into weighed portions before being assigned to the section or sections that will do the analytical work. The reason for this is that most materials analyzed by CMB-1 are of considerable value and must be accounted for and recovered after analyses are complete.

In general, this is the story of CMB-1, the analytical group at the Los Alamos Scientific Laboratory which probes matter far beyond the realm of earth, air, fire and water. Even though the constituents of matter can be measured in micro-units, the time when true measurements of anything can be made is apparently still a long way off. "No matter what you try to measure or how you try to measure it—exclusive of counting heads or apples—the very best that anyone can do is a very close approximation of the true value," said Metz. "The better your measuring instrument and the more diligently you apply it, the closer your measurement will be. It is the responsibility of the analytical chemist to see to it that his measurements are the most accurate and precise that can be made and, hopefully, close enough for the purposes at hand."

Helen Barker analyzes a material using the electron microprobe.

[illegible] Who [illegible]ght the [illegible]

[illegible]

The original [illegible] was set up under Colonel J. M. Harmon in January of 1943, in the Bishop building in Santa Fe. In April, three separate units totaling more than 300 men and women, moved to the Project. Included in this first group were Military Police and Provisional [illegible] WAC (Women's Army Corps) Detachments. [illegible] the 4817th Service Command Unit [illegible] Later, at a time when [illegible] personnel were extremely [illegible] officials were [illegible] would be available in a Special Engineer Detachment (SED).

The first battalion of Military Police (MP) was activated at Fort Riley, Kan., with 196 enlisted men and seven officers. At the end of 1946, it had reached its peak with a roster numbering 495. These [illegible] had rugged tours of duty. In addition to manning the gates [illegible] to the Project, they [illegible] inner security areas, apprehended traffic violators, issued summonses and testified in court proceedings. A portion of their duty involved mounted patrol and the horses they rode were some of the finest [illegible] the west had ever [illegible]

[illegible] of the [illegible] writer was anything [illegible] the MPs continued [illegible] until the end of 1946 [illegible] Provisional Engineer Detachment (PED) took care of community services for which civilian personnel were not available. This [illegible] such functions as operation [illegible] power plant [illegible] gas [illegible] repair of [illegible] These men, literally "jacks of all trades," labored at the fire stations, commissary, mess halls, post exchange and station hospital. Activated at Camp Claiborne, La., with 42 enlisted men and an officer, the unit grew to 488 men by the end of 1945. In April 1946 [illegible] hospital [illegible] clerks, telephone operators, [illegible] cooks and drivers. The detachment was formed in April, 1943, at Fort Sill, Okla., and, at its peak had a complement of 261 women. They departed in October of 1946.

The unit that is best known for its effort at Project Y is the 9812th Special Engineer Detachment formed in October [illegible] to supply technical personnel to the Laboratory, and [illegible] for whom deferments [illegible] secured. The SED [illegible] of the Eighth Service Command made valuable contributions to the research and development [illegible] Los Alamos, but their [illegible] was rather vague. [illegible] practice of [illegible] to work irregular and long hours this [illegible] conflict with barracks duty and formations. Also involved were such lowly and undignified assignments as KP. [illegible] Another problem was [illegible] by the fact that military promotions, which were the responsibility of the detachment's commanding officer, were the only material means available for recognition of responsibility and excellence in technical work. After a period of time, the rates of promotion became quite rapid, much to the satisfaction of the men involved.

By October of 1945, the unit had expanded to 1,823 men and officers. A number of present day Laboratory members first served on the Hill in the SED. Many young scientists were inducted into the Army and transferred to the SED. This happened to a small group in New York City that expressed concern on having to don khakis and were told: "Never mind, you will be assigned to the Manhattan District." Envisioning plush offices in the Empire State building, one must wonder what their thoughts were as they disembarked the California Limited in Lamy, New Mexico, where they boarded a dilapidated Army bus for the terrifying ride through Santa Fe, into Espanola and the "roller-coaster" road to Los Alamos.

All effort, military and civilian, pointed toward Trinity. The teamwork involving civilian and military personnel was clearly demonstrated at the Jornada del Muerto Site. MPs took up residence at the base camp late in December of 1944. Laboratory personnel agreed

Battle of Los Alamos...

that the wise and efficient running of the camp under extremely primitive conditions contributed greatly to the success of the test. PEDs operated equipment in development of the area and provided valuable logistic support. Many members of the Special Engineer Detachment were involved personally in the "shot heard 'round the world" on the morning of July 16, 1945.

Since Los Alamos was a secret post, troop strength could not be revealed. Therefore, Special Services did not come into being on the Hill until World War II was over. Recreation facilities and activities were provided by a small department under the Post Engineer's office. The Recreation department supervised all sports participation, both military and civilian. Baseball, softball, and basketball leagues were active each season, and there was a nine-hole golf course where the Western Area stands today. The center of activities was Theater No. 2, a huge barn-like structure that was used as a gymnasium, auditorium, motion picture theater, and chapel. In addition, a small low-power radio station was operated by a combination of military and civilian personnel on a part-time basis. This station gradually grew into full-time coverage and is KRSN today. Two all-GI dance bands, the "Keynotes" and the "Sad Sack Six" provided for Los Alamos dancers.

In 1945, a distinctive atomic shoulder patch was issued to all military personnel then under the assignment of the Manhattan District. It was a constant reminder to all who proudly wore it of the part they played in bringing about a successful conclusion of World War II. They were the stalwarts who "fought the battle of Los Alamos."

They Came Back

By Ken Johnson

"I was shocked. But, it's very nice," said William McCann of Bellview, Wash.

"It doesn't look anything like it did," commented Betty Darough, Vancouver, British Columbia.

"Every vestige of my old laboratory has been wiped out," said Sanford Simons, Denver, Colo.

"I'm flabbergasted," said Arnold (Nick) Bolnick, Long Island, N. Y., "Nothing's the same except for this old lodge."

"If someone hadn't told me I was in Los Alamos, I wouldn't have known it," said P. A. Howard of Jacksonville, Fla.

These were the comments of some of the more than 600 men and women who, with their families, were in Los Alamos for the veteran's reunion last month. During the three days of activities, the veterans attended a special welcoming ceremony and dinner; they were taken on guided tours of the community, the Los Alamos Scientific Laboratory's Science Museum and Exhibit Hall, and the Los Alamos Meson Physics Facility; and they were treated to a beer bust and barbeque.

More than 200 of these former GI's still live in the Los Alamos, Santa Fe and Albuquerque areas. Many others who attended the reunion from all parts of the United States had not visited Los Alamos for as long as 25 years, when the community was a secret war-time project known as the Manhattan Engineer District's Project Y which was assigned the task of developing an instrument of war—the world's first atomic bomb.

As might be expected of the men and women, who in uniform, helped usher in the nuclear age, reminiscing played a dominant role during the reunion. How they came to Project Y, what their jobs were, the security measures imposed upon them, their experiences as work progressed and culminated in the test of the world's first nuclear device at Trinity Site in Southern New Mexico were so commonly unique as to be taken for granted. But, in the passing of a quarter of a century, these things have grown from general acceptance to the irony of being classics of one of man's greatest endeavors.

Beginning in 1943, military men and women began to arrive in Los Alamos to fill a wide range of support and technical occupations. Some such as Gerold Tenney who still lives in Los Alamos, and Charles (Smokey) Stover, now of Pojoaque, thought that because their orders assigned them to the Manhattan District, they would be stationed in New York. Others, such as Jerry Roensch, Pat Krikorian, and Elsie Pierce, all of Los Alamos, thought they were going overseas. The GI's came by way of Albuquerque, Belen, and Lamy. From these points most of them were routed to the Project Y office in Room 8 of the Bishop building at 109 E. Palace Avenue in Santa Fe before being taken up the Hill.

Mrs. Krikorian recalls that she was one of several WAC's (Women's Army Corps) to arrive in Belen on

continued on next page

Winston and Jean Dabney, and Alvin Van Vessem, all of Los Alamos, greet Leonard Della-Moretta and his wife Nona at the registration desk at Fuller Lodge. The Della-Morettas now live in Pomona, Calif.

a train. There they boarded another train and were taken to Albuquerque. "The small engine had a cow-catcher and was towing a single car," she said. "An MP got on the train and went to Albuquerque with us. When we got there we were stashed in a hotel. We decided to go out and get a bite to eat, but discovered that our doors were being guarded by MP's. We got to go, but an MP went with us."

Ed Doty, now of Buffalo, N.Y., arrived by train at Lamy with eight other GI's. They observed a few track-side buildings as they stepped out of the coach and then stood facing the engine so they could see the town after the train moved away. He recalls the gloomy report of one of his companions: "Look what's on the other side—nothing."

Joseph Hirt, Alexandria, Va., remembers arriving in Lamy too ". . . which was nowhere and then I was taken to some other nowhere (Project Y)."

Most of these people were taken to the site on military buses or trucks, many of which were driven by WAC's. Maxine Quimby, who attended the reunion from Portland, Ore., and Miss Pierce, remember taking many GI's to and from the Project, in addition to lumber, groceries, furniture and anything else that needed to be transported to and from Los Alamos and Santa Fe or Albuquerque.

To cross the Rio Grande River on the old Otowi Bridge, Miss Quimby recalls, was sometimes as much an ordeal as the road up to the Site. "You had to make a tight turn onto the bridge and you couldn't make it with a big truck unless you stopped and jockeyed it back and forth for a while."

When the GI's arrived on the Hill, they weren't always properly clothed. Said Mrs. Krikorian, "When we arrived in Los Alamos it was cold and all we had were our summer khaki uniforms. We were issued "CCC" slickers, V-neck, knit sweaters and big arbuckle overshoes until we were finally issued winter uniforms. We had size 44 slickers that dragged on the ground. We were told we couldn't alter them to fit, so we turned the bottoms of the slickers back and held them in place with adhesive tape. The inside lining was a white material, so it made kind of a decorative hem. We folded the sleeves back and taped them the same way."

After the S Site Cafeteria was built, Mess Sergeant Stover put it into operation around the clock. "We served five meals every 24 hours,' Stover said, "to civilians and military. A meal, regardless of which one, was 25 cents to civilians."

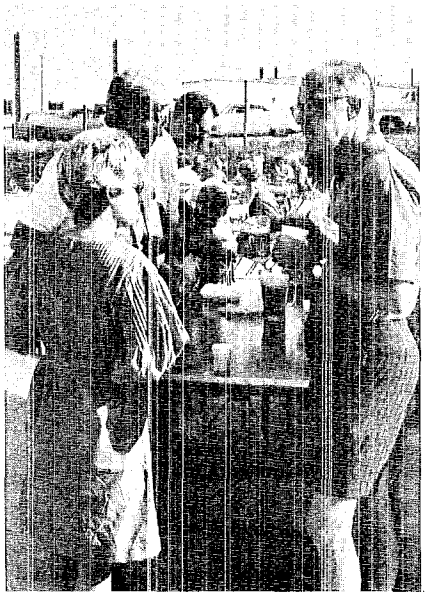
Jobs weren't always matched with a person's training as was the case with Bolnick, Doty and their six companions that had arrived together. All of them, to the dismay of Robert Dunlap of the Chemistry division, had college degrees. Dunlap told the group of men that the work they were going to do wasn't 'exactly' fitted to their backgrounds. Bolnick, a chemistry major, agreed. "I was insulted. The job was washing glassware in a chemistry laboratory." Most of the men eventually found work more compatable with their training. Bolnick ended up as first sergeant of half of the SED forces under Sergeant Major Winston Dabney, who still lives in Los Alamos. Doty was placed in charge of procurement expediting and special warehousing.

Several of the GI's met their husbands or wives at Project Y. Among them were Winston and Jean Dabney. Dabney is chairman of the veteran's reunion steering commitee and Mrs. Dabney is WAC detachment coordinator. They met on a blind date at the PX. Arno and Jerry Roensch, also of Los Alamos met on a dance floor. Arno played the trumpet for the "Sad Sack Six" at Saturday night dances. Samuel and Betty Davalos, now of Santa Fe, worked together at Project Y. Captain Davalos was in charge of the technical post engineers and Lieutenant Miller (Mrs. Davelos) was his administrative assistant.

Not all who were assigned to Project Y knew of its purpose. Those who were employed in technical occupations knew more about the Project than did those in supporting roles, although as time went on, many learned something about it by listening to others talk or by reading in the report library.

Jay Wechsler, who still resides

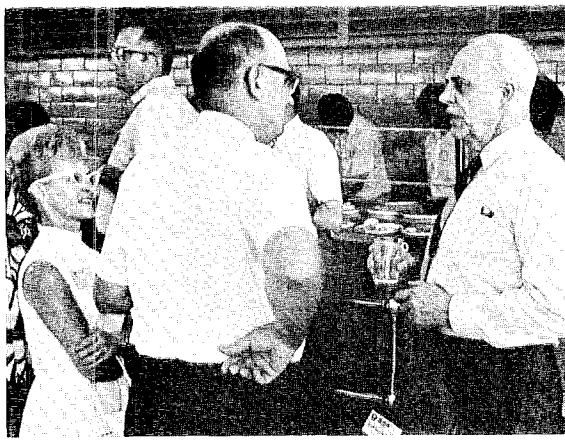
continued on page 13



Larry and Edna Bayer, Redondo Beach, Calif., renewed their friendship with Ed Doty, right, Buffalo, N.Y.

Above, Maxine Quimby, Portland, Ore., Mr. and Mrs. Arnold Bolnick, Long Island, N.Y., and Jay Wechsler, Los Alamos, were among the many veterans who spent much of the first day talking with old friends at the Lodge. It was Bolnick's first visit to Los Alamos since he was discharged from the Army 25 years ago. Left, Community Tour Guide Charlie Mitchell, PUB-DO, describes changes that have taken place in Los Alamos over the past quarter century. To his left is Roger Kleinschmidt and his wife Jean. The Kleinschmidts now live in Bartlesville, Okla. Behind them is Betty Darough, Vancouver, British Columbia.

Left, P. A. Howard, Jacksonville, Fla., shows pictures of his family to Betty Webster, Pontiac, Mich., during one of the bus tours. Right, Bob Freyman and his wife Marilyn, Los Alamos, visit with Ralph Carlisle Smith, Las Vegas, N.M.



Left, at the barbecue, the GI's "hurry up and wait"—again. Above, dignitaries who took part in the program at Civic Auditorium, following dinner at the high school cafeteria, were Robert Porton, PUB-2 group leader and GI representative; Helen Ketola, Los Alamos, WAC representative; Norris Bradbury, director of the Los Alamos Scientific Laboratory; Lieutenant General Austin Betts, Fort Myer, Va.; H. Jack Blackwell, Atomic Energy Commission manager of the Los Alamos Area Office. Delbert Sundberg, chairman of the Los Alamos County Council, not shown, was offering his welcoming remarks to the veterans when this photograph was taken.

Above, Carl Nottrott, Los Alamos, reaches across the table at the high school cafeteria to shake hands with Caswell Forrest, Columbia, S.C. Standing at right is Sidney Newberger, Prairie Village, Kan. Left, Mr. and Mrs. Gerold Tenney, Los Alamos, talk with Lieutenant General Betts following dinner at the high school cafeteria. Betts was the keynote speaker at welcoming ceremonies following the dinner. Right, Manuel Morales and Samuel Davalos, both of Santa Fe, swap stories at the beer bust.

in Los Alamos, was assigned to work under the renowned scientist Otto Frisch in the development of fission counter equipment. "I had no inkling of what was going on until I started working with Frisch and found out just who he was," Wechsler said. "Frisch had suggested that I read some reports in the report library. I did, and bells started ringing."

Said Miss Sergeant Stover, "It didn't take me long to get the feeling that I wasn't supposed to know anything about the Project, and I didn't really want to know. I figured if I didn't know anything, I wouldn't be giving any secrets away."

Security measures were so severe that even the mail was censored and telephones were monitored by the Security division. Bolnick had a problem that was probably not his alone. "My wife called me and wanted to know where I was and what I was doing. I couldn't tell her anything. She was mad and she said she was coming to Santa Fe to see me whether I liked it or not. I knew the call was being monitored. I told her, 'Honey, if you love me, stay where you are.' Later I was told that if she did show up, I would suddenly disappear for the duration of the war."

Mrs. Krikorian was receiving letters from her brother who was overseas. He wrote about a certain horse at the Project Y riding stables, certain people and other features in and around the Project and Santa Fe. Because of the secrecy concerning the Hill, Major Peer de Silva, project intelligence officer, became upset to the point that Mrs. Krikorian was told that to write or to receive letters from her brother anymore was forbidden. After the war, her brother gave her a hand-penciled map of Los Alamos. This and other information had been passed on to him by a friend who grew up at the Los Alamos Boys' Ranch School which had been taken over by Project Y.

Glendon Roush, now of Ironton, Ohio, was an MP who spent a considerable amount of time guarding the entrance to D building in the technical area. What was D building? "I don't know," Roush still admits. The only thing he recalls that indicated to him something was going to happen was "one night when I was on guard duty, some guy came out of the building and said, 'It won't be as long as it has been.' That's all I knew."

What the word-dropper obviously meant was that preparations were underway to test the implosion device at Trinity Site.

Alvin Van Vessem, Los Alamos coordinator for the reunion, remembers he was involved in assembling the device at Project Y and then "rode shotgun" with George Kistiakowsky (Explosives division leader) on the HE part of the assembly to Trinity Site. "Just outside of Socorro there was a car sitting on the shoulder of the road and somebody's feet were sticking out the door on the right side. We had a siren on our truck. When the siren started, a guy jumped out of the car and started running across the field. For as long as we could see, he never stopped. It might have been an abandoned car and maybe he was trying to wire up the switch."

Tenney was the only GI on a bus filled with scientists and other dignitaries that were on the way to the Site to see the test. During a stop in Albuquerque a curious civilian asked about the group and where it was going. "These guys are inductees and I'm taking them to an induction center," Tenney replied.

Wechsler was also on his way to the site. "We drove on old 4 x 4 weapons carrier in a convoy during the middle of the night. Along the way we stopped and cooked C rations on the manifold of the truck."

At Trinity, Wechsler was placed in charge of of a detail of men to map an area "in case we had to evacuate any sheep herders," he said. "We decided the day before the shot where we wanted to be to watch. It was frightening. The light was so bright that if you put your hands in front of your eyes, you could see right through them. It wasn't like a sudden explosion; the fire ball kept growing like it wasn't going to stop; it went on and on."

The night before the device was detonated, Van Vessem and others stretched out on a hillside several miles from ground zero. "No one wanted to sleep," he said. "We just talked and relaxed. I watched the explosion through smoked glasses; it was fantastic, hard to explain."

Others who were not directly involved in the Trinity test watched from other places.

Bob Freyman, Los Alamos, recalls that he and his first wife, who was staying in Albuquerque, were in one of several cars parked on a road west of Albuquerque. A state patrolman stopped and asked what they were doing there. "We're necking," Freyman told the officer.

Freyman knew when the device was to be detonated, and when that time had passed and there was no explosion, he thought it had been canceled. But, it had only been postponed. The Freymans drove back to Albuquerque and were entering his wife's apartment when it went off.

Sergeant Major Dabney, WAC Master Sergeant Jean Waiter, scientist Darol Froman, and others looked south from somewhere in the Jemez Mountains southwest of Los Alamos. "There was a storm between us and the test site," Dabney recalls, "but we saw the flash of light and felt the shock wave." Sergeant Waiter later became Mrs. Dabney.

At noon that day, Technical Sergeant Robert Y. Porton, post athletic director and chief radio announcer for KRS tuned in Albuquerque Radio Station KOB on which Project Y inhabitants relied for national news. Porton, Los Alamos, said, "I'll never forget how people converged on the radio station just in time to hear KOB announcer Bob Lloyd announce that a huge ammunition dump had blown up near Alamogordo. Then, they kind of smiled and left."

short subjects

Kay D. Lathrop, T-1 alternate group leader, has been elected chairman of the 11,000-member Mathematics and Computation division of the American Nuclear Society.

Lathrop will assume the duties of chairman July 1 for one year.

The division's objectives include promoting the use of computing machinery in solving problems in the nuclear business; aiding in the dissemination, integration and proper use of various computer programs developed for such purposes; encouraging the development of new computer programs and broadening their use in the solution of problems in relation to nuclear science and technology.

Charles E. Holley, Jr., CMF-2 group leader, has been appointed to a three year term on the Executive committee of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science.

Holley is a former chairman of the Division's Physical Sciences Section.

The Association's objectives are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

Rolf E. Peterson, Dir. Off. RADH, has been appointed chairman of the LASL Reactor Safety committee, and **Earl Swickard,** N-6, has been named a new member.

Other members are **Henry Motz,** P-DO, **John Orndoff,** N-2 alternate group leader, **Roy Reider,** H-3 group leader, and **John Yarnell,** P-2 group leader.

The committee reviews and either approves or disapproves with requested changes, the operations and procedures employed for the LASL Critical Assembly Facility, for Laboratory reactors, and for proposed changes in design, operation or procedures.

Ann H. Beyer, D-2 reference librarian, has been elected president of the Rio Grande Chapter of the Special Libraries Association. Mrs. Beyer formerly served as treasurer of the organization.

Marilyn H. Treiman, also a reference librarian in D-2, was appointed editor of the Chapter's bulletin.

Paul Wagner, CMF-13, was elected to the Board of Governors of the International Thermal Expansion Symposium during business conducted at the Second Symposium on Thermal Expansion in Santa Fe recently.

Wagner is also a member of the Board of Governors for the Thermal Conductivity Conferences which will be held in Boston in October.

Zevi W. Salsburg, consultant for GMX division, died recently in Livermore, California. Salsburg worked as a graduate student with GMX division during the summers of 1951 through 1953. He joined the staff of Rice University in 1954 and became a consultant in 1955. He is survived by his wife, Bertha, and two children, Alan and Linda. His home was in Houston, Texas.

James R. Lilienthal, CMB-7 group leader, was re-elected treasurer and **John D. Orndoff,** N-2 alternate group leader, was named a "Fellow" at the 16th Annual Meeting of the American Nuclear Society in Los Angeles.

Lilienthal's activities in the Society have included chairing the Remote Systems Technology division, the Publications committee, and membership on the Board of Directors, the Executive committee, the Nominating committee and the Finance committee. He also served on the Steering committee for the 1968 international meeting.

Fellowship in the Society is reserved for acknowledged attainment in the nuclear field by notable original research or invention, by technical leadership of substantial scope, or by outstanding leadership as a teacher.

Orndoff was cited for leadership in the measurement of fission-chain parameters, for pioneering contributions to fast-burst reactors, and for expert planning and execution of Rover neutronic studies.

The Society is a non-profit international scientific, engineering and education organization of more than 7,500 members.

Louis Rosen, MP division leader, had ear-to-ear smiles.

The 5 MeV Birthday Beam

Story and Photos
By Bill Regan

Early last month MP Division Leader Louis Rosen received a unique birthday tribute that only the father of an accelerator could properly appreciate.

Power was turned on and the Los Alamos Meson Physics Facility (LAMPF) linear accelerator produced its first proton beam. The time was five minutes before midnight. The date was June 10, Rosen's 52nd birthday. And appreciate it he did, if ear-to-ear smiles were any indication.

It was only a small beam—5 MeV—as compared to the 800 MeV beam that will be produced when the accelerator is completed. But it marked the transition from theory to performance. The June 10 "turn on" tested the performance of the Crockcroft-Walton injector, the beam transport system and the first drift-tube tank of the Alvarez section.

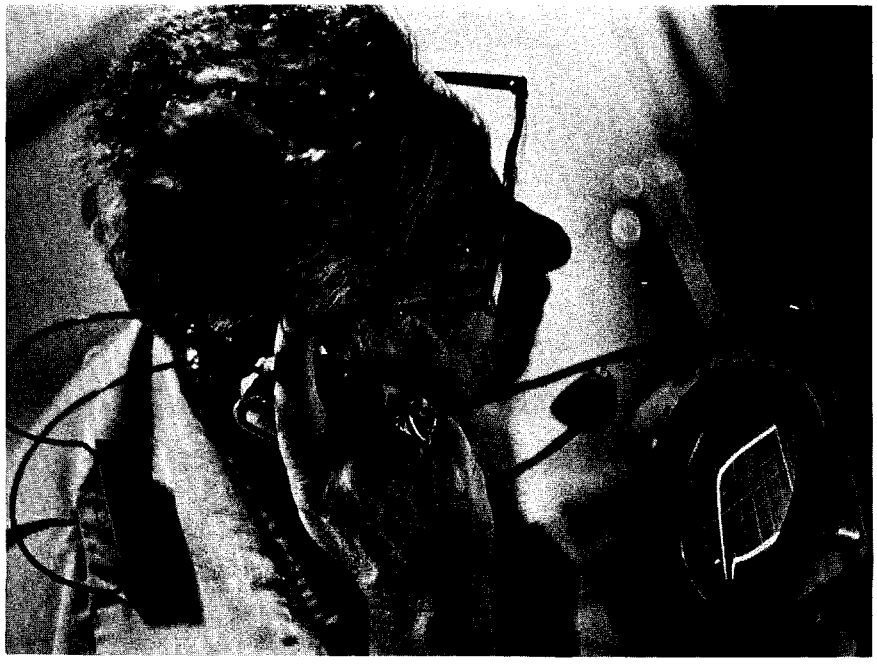
In about a year, a 100 MeV beam will be produced utilizing the complete four-tank, drift-tube portion of the three-section linac. In two years, it is hoped that the full 800 MeV proton beam will be pulsed for the first time. Target date for this end point in the construction phase of LAMPF is July 4, 1972.

With the ceremonial "first beam" performance out of the way, scientists and technicians of groups MP-1, MP-2, MP-3 and MP-4 have been busy installing diagnostic equipment and starting a series of tests to measure the quality of the beam, determine radiation patterns and acquire better understanding of the operating characteristics of this first section of LAMPF accelerator.

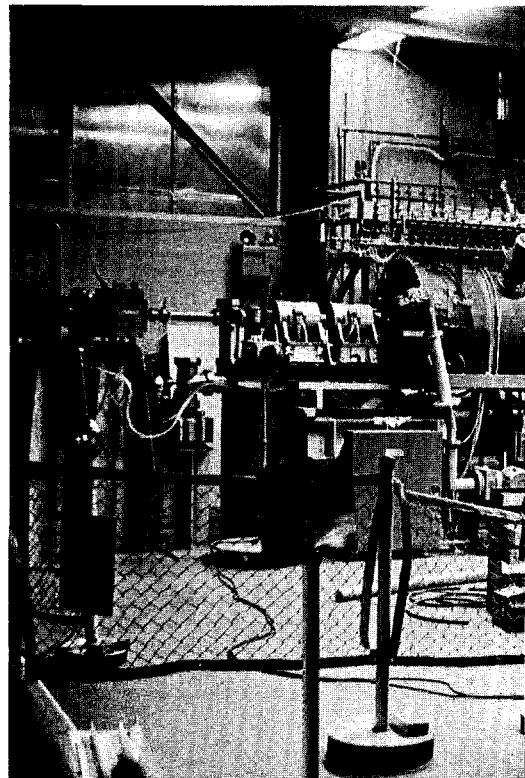
Radiation patterns must be monitored and analyzed so that recommendations can be made for installation of proper shield walls for protection of personnel. The beam has been turned on only at night after workmen have left the area. Otherwise, construction work would have to be halted while the beam is on. After necessary shielding and safety barriers are installed, test operations can be conducted during the day.

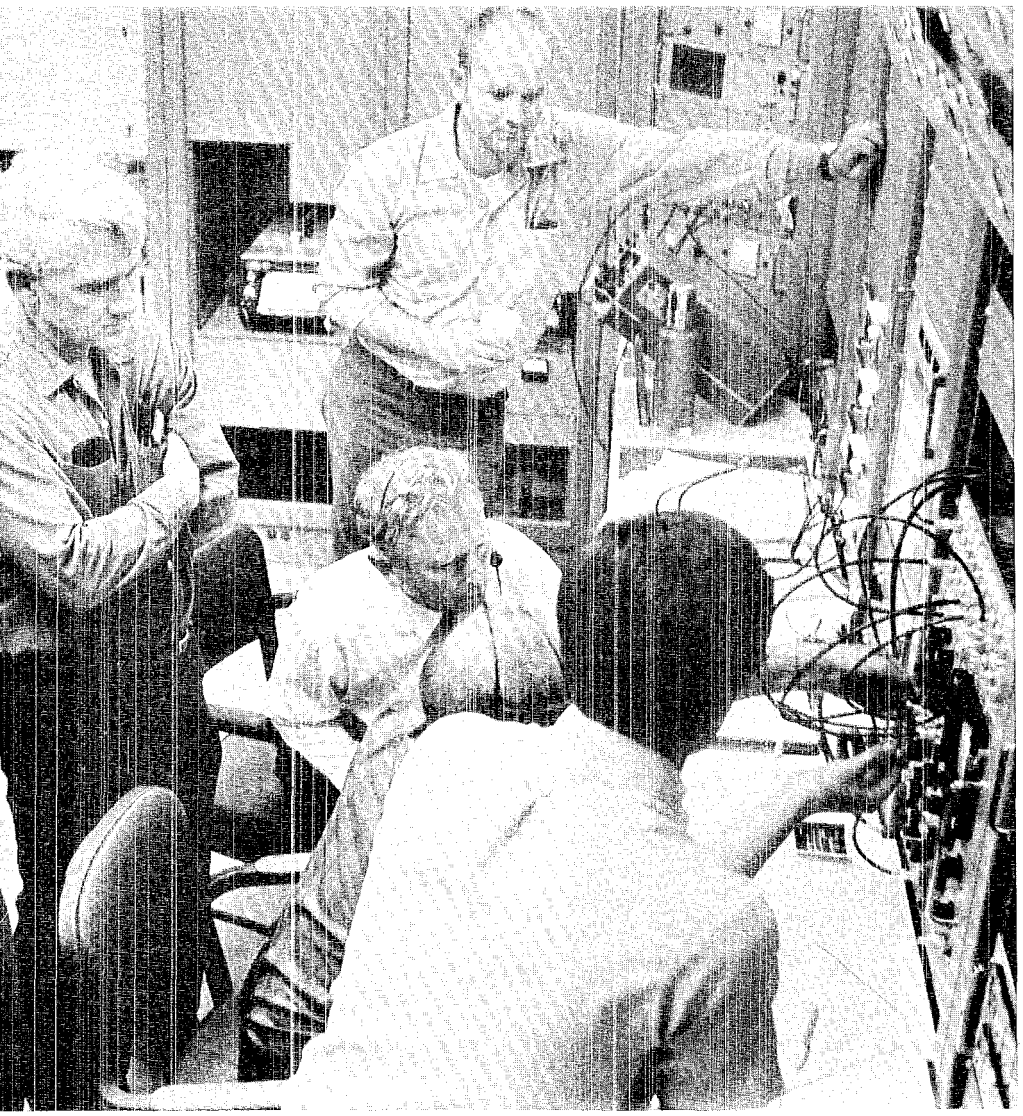
continued on page 17

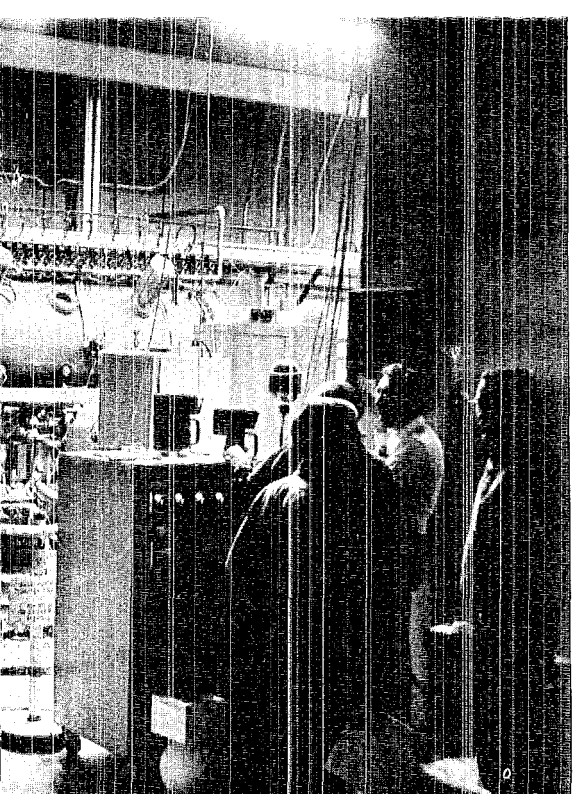
Tom Putnam, MP-1 group leader, left, and Bob Emigh, MP-4 assistant group leader anxiously checked data on first beam test.



Tom Boyd, MP-2 alternate group leader, kept close watch over an oscilloscope screen during the 5 MeV test. The scope trace indicated how much of the beam was hitting target.







All eyes watched the instrument console manned by Don Swenson, MP-3 assistant group leader, partly hidden in right foreground. Rosen, seated next to Swenson, kept particularly close watch for first indication of beam production. At left of Rosen are Darragh Nagle, alternate MP division leader, and Ed Knapp, assistant MP division leader. J. Ross Faulkner, MP-2, is behind Rosen. In background are Don Hagerman, partly hidden, MP-2 group leader and assistant division leader; Paul Allison, MP-4; and Ed Bush, MP-3.

Health monitors stood by their instruments waiting for first indication that the 5 MeV LAMPF beam was on and producing neutrons in the target area. First tank of the Alvarez section is visible in the center of photograph.

A magnetic spectrometer is now mounted in the beam line and a crew led by Don Swenson, MP-3 associate group leader, is measuring the energy spectrum of the particles to determine what percentage of the injected protons is actually accelerated.

Another important measurement underway is determination of beam emittance, a measure of the quality of the beam. Quality in this respect refers to how small the beam can be focused and how many particles are retained in as near parallel paths to the beam center line as possible. Particles are analyzed for angle of divergence from the beam line and position in the beam. This measurement can be likened to determining the pellet pattern for a shot gun. In this case the pellets are protons and it is necessary to determine the spread of the pattern in three dimensions rather that in a flat plane.

Emittance will then be compared with the admittance, or the capability to accept accelerated particles, of the side-coupled cavity section. The downstream third section of the accelerator should be able to accept all the particles accelerated from the Alvarez section tanks, provided that the side-coupled cavity section admittance capability is larger than the emittance of the preceding Alvarez section.

During the first test in June, peak current into the Alvarez drift-tube tank was about one milliampere (mA). According to Bob Emigh, MP-4 assistant group leader, this will be brought up to 20 mA. To attain the design specifications for the complete LAMPF linac of one mA average current it is necessary to run at a peak current of at least 16.7 mA. The 750 keV Cockcroft-Walton injector which operated at 710 keV for the first test has now operated at up to 840 keV. The injector system has performed well in "over design level" operations.

Bradbury-a resolution in appreciation . . .

A resolution from the regents of the University of California was presented to Norris E. Bradbury, director of the Los Alamos Scientific Laboratory, at a special dinner recently in Los Alamos.

The resolution, in appreciation of Bradbury's work in directing LASL activities over the past 25 years, was presented by University President Charles J. Hitch: It reads:

WHEREAS, Norris Edwin Bradbury has chosen to relinquish the directorship of the Los Alamos Scientific Laboratory of the University of California on Sept. 1, 1970, after a quarter century of dedicated service; and

WHEREAS, he has brought distinction to the University of California on whose faculty he has served as Professor of Physics in absentia since 1950; and

WHEREAS, he has encouraged a climate of creativity at the Laboratory, and has always affirmed his belief that technology must serve people and that the dignity of the individual is paramount; and

WHEREAS, along with carrying his heavy responsibilities as Director, he has participated in civic affairs to the benefit of his city, his state, and his nation, earning respect and gratitude of both scientists and the general public; and

WHEREAS, he has been an eloquent spokesman for international understanding and peaceful cooperation, exemplified by his testimony before the United States Senate in 1963 favoring the Nuclear Test Ban Treaty: "I, myself, with considerable knowledge of nuclear things, with some knowledge of their military use, but with only a plain citizen's feelings about people and nations and hopes and fears, would prefer to follow the path of hope."

NOW, THEREFORE, BE IT RESOLVED that The Regents of the University of California do hereby express to Norris E. Bradbury their deep appreciation and gratitude for his great contribution to nuclear science and for his skill and vision in translating scientific concepts into reality.

AND BE IT RESOLVED that a suitably inscribed copy of this resolution be transmitted to him as a token of The Regents' high esteem.

Norris Bradbury is congratulated by his wife Lois after he received the resolution from the regents of the University of California. With the Bradburys is Charles Hitch, president of the University who presented the resolution.

and the Enrico Fermi Award

Norris E. Bradbury, director of the Los Alamos Scientific Laboratory for a quarter of a century, has been selected to receive the Atomic Energy Commission's coveted Enrico Fermi Award for 1970. The presentation will be made in Los Alamos Aug. 29 as part of a public ceremony planned in his honor.

Bradbury, who has announced he will resign his position at the Laboratory effective Sept. 1, is the 14th recipient of the award. It is presented for outstanding scientific achievements or contributions to engineering and technical management in the development of atomic energy.

The award is named for the late Enrico Fermi who headed the effort which resulted in the first sustained controlled nuclear chain reaction at the University of Chicago in 1942. Fermi in 1954 was the first recipient of an award under the provisions of the Atomic Energy Act. The Commission decided that subsequent awards should bear his name.

The award consists of $25,000, a gold medal and a citation. Bradbury's citation reads:

For his inspiring leadership and superb direction of the Los Alamos Scientific Laboratory throughout one quarter of a century, and for his great contributions to the national security and to the peacetime applications of atomic energy.

The LASL director was selected for the honor by the AEC after consideration of nominations by its General Advisory Committee. President Nixon approved the selection.

Bradbury came to Los Alamos in 1944 as a naval officer and professor of physics on leave from Stanford University. He was placed in charge of the assembly of non-nuclear components for the first nuclear device which was tested at Alamogordo, New Mexico, July 16, 1945.

In recognition of his wartime contributions, Bradbury was named to succeed J. Robert Oppenheimer as director of the Laboratory in Oct., 1945. Under his leadership, the Laboratory has grown from a complex of temporary wartime structures to one of the nation's largest institutions dedicated to basic and applied research in virtually all fields of nuclear science.

As Laboratory director, Bradbury played a major role in planning nuclear weapons development, directing research on advanced weapon concepts, and conducting field tests. The U.S. tests from 1948 through 1952 at Eniwetok and Nevada resulted in data that completely revolutionized nuclear weapon technology and served as the scientific basis which has made the U.S. nuclear capability the cornerstone of the free world's security.

An outstanding physicist in his own right, the director saw great promise in the peaceful uses of atomic energy. While maintaining the Laboratory's defense activities, LASL has become a primary center for research in the chemistry and metallurgy of uranium and plutonium.

The Laboratory is the leader in nuclear rocket propulsion technology and has pioneered in development efforts on controlled thermonuclear reactions, radiation biology, and space nuclear systems. Major activities are currently devoted to nuclear safety and exploring techniques to enhance our capability to safeguard nuclear material. Typical of Bradbury's foresight to achieve the necessary balance between peaceful and defense efforts was his personal desire to establish the Laboratory as a center for unclassified research in medium energy physics. The Los Alamos Meson Physics Facility, which is under construction, will serve scientists from the regional and national academic community.

Jane Hall To Receive AEC Citation

Jane Hamilton Hall, former assistant director of the Los Alamos Scientific Laboratory has been selected to receive the Atomic Energy Commission Citation. The citation and gold medal will be presented to her at a ceremony Oct. 6 in Los Alamos by Glenn T. Seaborg, chairman of the Atomic Energy Commission.

The citation is presented to private individuals and employees of AEC contractors who have made especially meritorious contributions to or have been clearly outstanding in the nuclear energy program. Individuals in other federal agencies or departments, the military forces, and in industrial, educational and research institutions are also eligible to receive the award.

Mrs. Hall's citation reads:

For her outstanding service to the nation's atomic energy program during World War II at the Metallurgical Laboratory, the Hanford Engineer Works, and the Los Alamos Scientific Laboratory; for her pioneering work in the weapons program at Los Alamos since 1945; for her significant contributions to the design and construction of the world's first fast-neutron reactor; for her dedicated service as secretary of the General Advisory Committee, 1956-59, and since 1966 as the first woman member of that committee; and for her leadership and continuing contributions in physics research and laboratory management as assistant director of the Los Alamos Scientific Laboratory since 1958.

Mrs. Hall, the first woman to receive the award since its establishment in 1958, left the Laboratory June 30 after being associated with the nation's atomic energy program for more than 25 years.

A native of Denver, Colo., Mrs. Hall received the B.S. degree in 1937, the master's degree in 1938, and the Ph.D. in physics in 1942, all from the University of Chicago. After a year as instructor in physics at the University of Denver, she joined the staff of the Manhattan Project's Metallurgical Laboratory at the University of Chicago and subsequently played an important role in the fields of nuclear weapons technology, medical research, neutron physics and reactor development.

In 1944-45 she was a senior supervisor at the Manhattan Project's Hanford Engineer Works, conducting research in health physics for the Du Pont Company. In 1945 she began her long association with the Los Alamos Scientific Laboratory, serving as a staff member until 1958 when she became the Laboratory's assistant director.

During her years at Los Alamos, she was a member of the team of scientists who designed and built "Clementine," the world's first fast reactor, the first to be fueled with plutonium, and the first to employ a liquid-metal coolant. After start-up in 1946 the reactor was used for fast-neutron experiments and reactor studies essential to the weapons program. It was dismantled in 1953.

Mrs. Hall served as secretary of the AEC General Advisory committee from 1956 until 1959. In 1966 President Johnson appointed her as the first woman member of the committee. Her six-year term expires in 1972. Since 1967, she has also been a member of the Advisory committee on Nuclear Materials Safeguards.

In 1958 she was a delegate to the second international conference on the peaceful uses of atomic energy in Geneva, Switzerland. She is a fellow of the American Physical Society.

Gerold Tenney, Max Roy Leave Laboratory Following a Quarter Century of Service

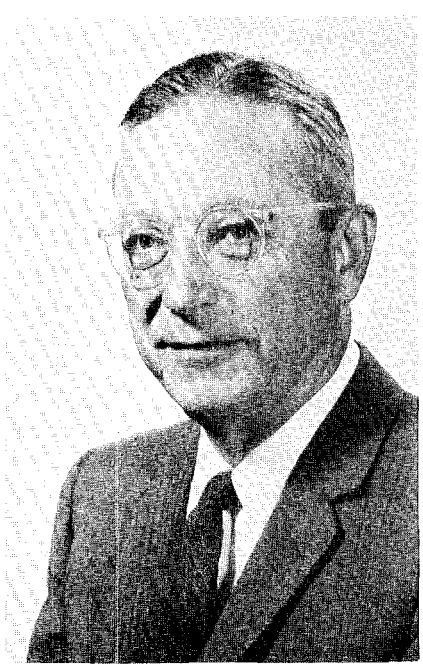
In addition to Mrs. Hall, two other members of the Director's office staff have left the Laboratory after a quarter century of service.

They are Gerold H. Tenney, technical advisor on nondestructive testing, and Max F. Roy, assistant director for production.

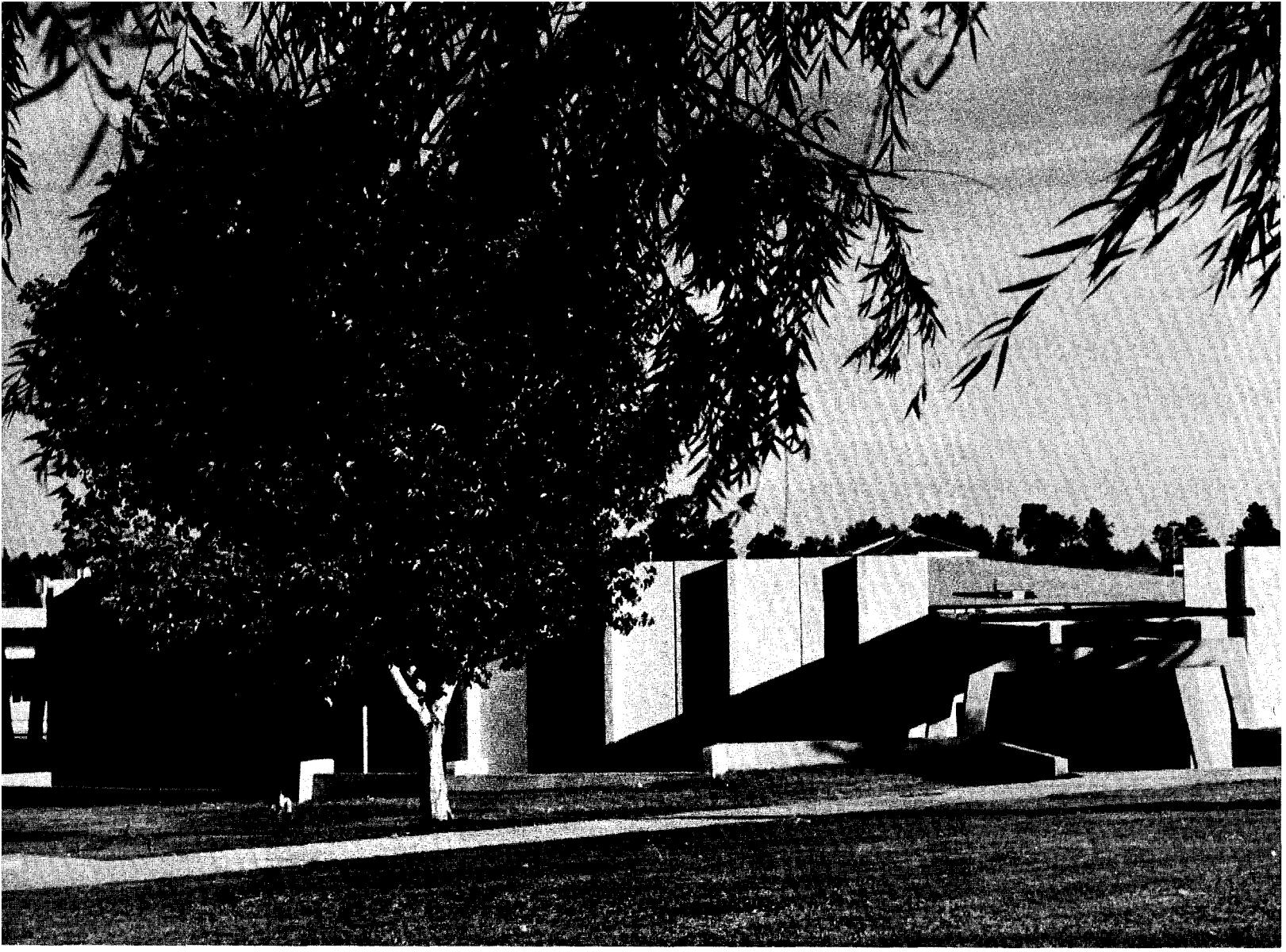
Tenney pioneered in nondestructive testing work when he came to Los Alamos in 1944 as a member of the military forces, and has since received many honors for his achievements. He has authored approximately 50 publications in the field of nondestructive testing.

Roy came to Los Alamos in 1945 and has made valuable contributions to the knowledge of triarylmethyl free radicals, infrared spectra of organic compounds, and military explosives.

Gerold H. Tenney



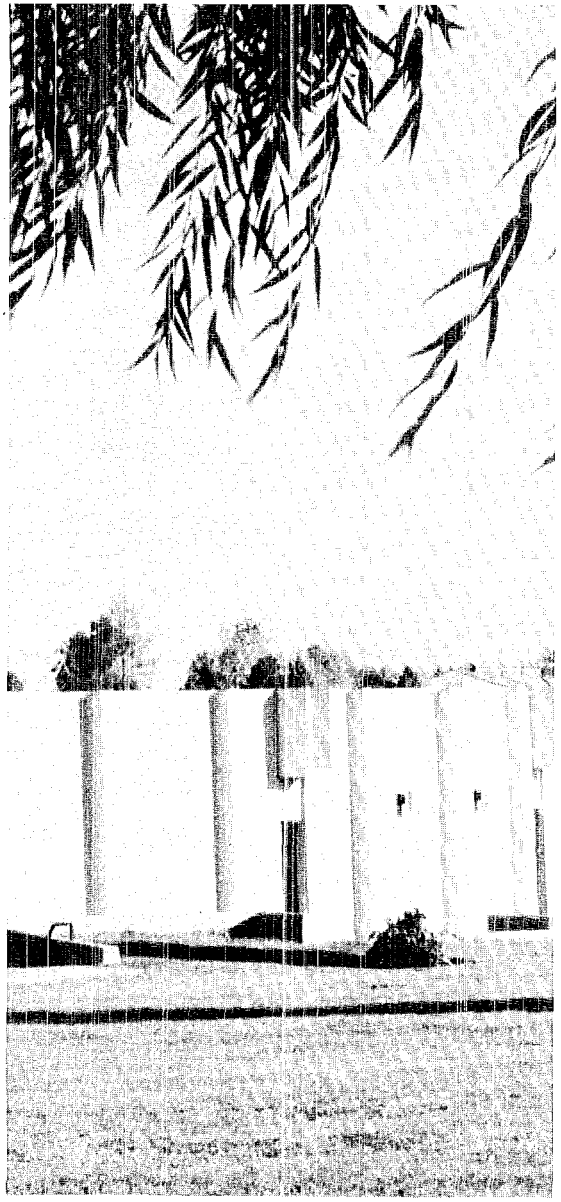
Max F. Roy



The Instructional Materials Center is in the middle of the Los Alamos High School building complex.

Parents and Students Rated the Los Alamos Schools

: BY THE NU



MBERS

Editor's Note: The final reports on the Parent and Student Appraisals of the Los Alamos School system examine questionnaire responses thoroughly and in minute detail. Because of space limitations only a brief perusal of some of the highlights appear in "The Atom." Readers who wish more complete information on the survey should consult copies of the appraisals which are available at Mesa Public Library and in the office of the superintendent of schools.

By Barbara Storms

How good are Los Alamos schools?

"Great" is the considered opinion of the folk who care the most—parents of children who attend them—and of a major portion of the high school student body as well. In fact, parents think enough of the quality of education their children are receiving on the Hill that a large percentage of them say the schools have played an important part in their decisions to come to or remain in Los Alamos.

The school system received its high grades this spring as a result of a 39-question appraisal questionnaire sent to every Los Alamos school parent and a similar questionnaire distributed to all high school students by an Ad Hoc committee for Appraisal of Schools.

At the request of incoming School Superintendent Joseph M. Carroll and with school board approval, the committee was formed to include eight parents—Mrs. Bob E. Watt, chairman, Harry E. Ballance, Mrs. Leon J. Brown, Mrs. Jim Cabbell, Mrs. Edward S. Keddy, Donald P. MacMillan, Jose P. Quintana and Peter G. Salgado; two students—Frank Guevara and Barbara Wilson; two teachers—Stanley L. DeGeer and Mrs. A. R. Lyle; and two school administrators—Dr. Carroll and Duane W. Smith. Work began in October with help from Dr. Ronald E. Blood, associate professor of Education at the University of New Mexico, and in late November the appraisal forms were sent to 2,500 parents. A similar form was filled out at school the same day by 1,080 students.

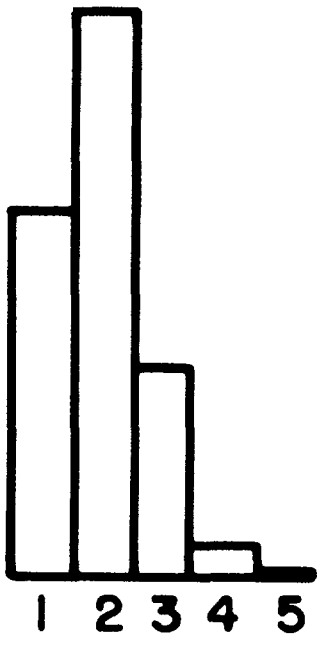
Over the succeeding six months, results of the returned appraisals were data-processed at UNM and the comments in them were compiled, sorted and compared with statistical data by the committee. The combined results were then studied, discussed, evaluated and ultimately compiled in an inch-thick volume. Responses to the student appraisal took less time and were completed in a separate volume in mid-December. Reports have been distributed to members of the school board, to each teacher and administrator and to school and public libraries.

As a result of the student appraisal and preliminary data from the parent appraisal, the schools have already hired two new guidance personnel and added engineering technology to the industrial arts curriculum. Superintendent Carroll is studying the appraisals and plans to submit a series of additional recommendations based on them for approval by the school board.

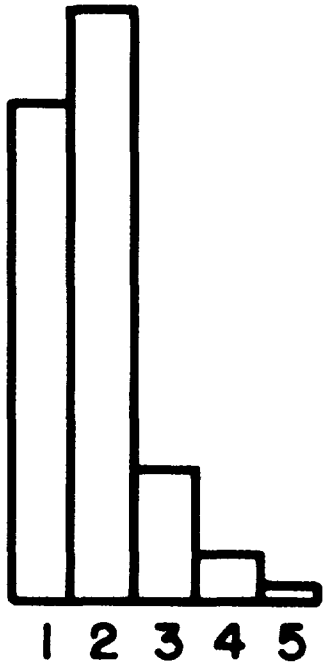
One of the first points made clear by the questionnaire was that Los Alamos parents *care*.

Although the form was long, time-consuming, occasionally difficult to answer, and the time allotted for completion was short, 1,416 of the 2,500 questionnaires were returned in time to be included in

continued on next page



The bar graphs on this and subsequent pages indicate the distribution of answers to specific questions. The numbers, one through five, under each graph make up the rating scale. The number one is the highest rating and five is the lowest. The graph above shows how the parents rated "the total program of education which you think students receive. . . ." The graph below shows how the high school students rated how they felt "about the total program of education available to students. . . ."



the survey—a 57 per cent return, considered remarkable by statisticians.

In addition to choosing numbered answers for 39 questions, 875 parents took the time to write comments in the spaces provided and hundreds more were included elsewhere in the questionnaire or attached separately.

"(We) had no trouble discerning that Los Alamos parents are very interested in the schools and what the schools are doing for their children," the committee reported.

Overall, the committee concluded that Los Alamos parents think the education their children receive is well above average and most parents regard the Los Alamos schools as better than other schools with which they are acquainted.

On a rating scale of 1 (very good) to 5 (very poor) parents were asked to rate the total program of education. Responses were (1) 422; (2) 651; (3) 253; (4) 50 and (5) 8. More than 125 parents expressed general satisfaction with the system in their comments.

"Your overall grade is A-. I doubt that very many systems do better," wrote one parent. "We are delighted with the constant effort exhibited by administrators and teachers to maintain the excellence of our school system," wrote another.

But not all parents were entirely enchanted.

"For the amount of money spent and the amount and quality of equipment available, it does not seem that the quality of education is as good as it should be."

Others criticized more specifically, indicating that the system is geared to the better-than-average student, that the standards are too high for many children, that the average student must struggle on his own and the slow student is neglected. This complaint appeared time and again throughout the appraisal.

Parents coming to the Hill from other New Mexico school systems generally rated Los Alamos schools high although those from schools outside the state were inclined to be slightly less generous.

While the quality of the schools was an important factor in the decision of many parents to come to Los Alamos it was a more important factor to many more parents in their decisions to stay. To the question of the school's influence in decisions to remain, 1,046 parents gave 1 and 2 (very important) responses compared with 228 who answered 3 (average importance) and 130 who gave 4 or 5 (not important) responses.

"Although the school system did not bring us here, it is one of the things keeping us here," wrote one parent. "Should have moved here five years sooner," wrote another.

In contrast, another parent wrote, "We are quite disturbed about the educational situation in Los Alamos and have considered leaving because of it."

High school students tended to agree with the parents in appraising the system as a whole. Almost 80 per cent of them rated Los Alamos schools as "high" or "very high" in comparison with other schools with which they were acquainted and an even greater number rated the total educational program in Los Alamos as above average. Like the parents, students who came to Los Alamos from other New Mexico schools were more enthusiastic than those from out-of-state.

The parents' appraisal of the schools' curriculum, area by area and school level by school level, agreed with their general appraisal of the program as a whole. At least 80 per cent of the responding parents rated the 15 curriculum areas in the direction of "excellent" at each school level and in each case the high ratings exceeded the "average" ratings, often by a large margin.

Guidance was the only curriculum area to be rated below average by more than 20 per cent of the respondents at all three school levels. Although most parents rated guidance as "average" to "excellent," low (4 to 5) responses

amounted to 27 per cent, 31 per cent and 33 per cent of the totals for elementary, junior high and high school levels, respectively.

High school students rated guidance much higher than did the parents but in response to other questions they indicated a reluctance to communicate freely with the guidance counselors.

The majority of parents rated the reading, English and mathematics curriculum very high but a significant number indicated considerable concern that the schools are not stressing enough the fundamental skills of reading, grammar, spelling and arithmetic. These parents wrote that these skills should be learned first and solidly before the child moves on to other subjects.

A number of parents felt these were deficiencies that could be attributed to other deficiencies in the curriculum such as an imbalance between basic subjects and enrichment courses, an overemphasis on science, or the failure of schools to teach children how to study.

Critics were most emphatic and emotional on the subject of reading.

"To graduate even one child who cannot read is a disgrace," wrote one parent.

Other parents deplored the lack of emphasis on English:

"The proficiency of students to write and speak well grammatically, to spell accurately and to express themselves clearly leaves much to be desired."

"Too much time is spent in elementary grades on 'specials' which cannot take the place of proper English usage, proper spelling or good penmanship."

A number of parents complained of overemphasis on science, especially in the elementary grades, at the expense of fundamentals.

"Science courses, science fairs, well-equipped science rooms . . . all contribute to the overemphasis. . . . Conversely, the lack of instruction in the English language is appalling. . . ." wrote one.

As if to corroborate the parental concern, one student critic of English study wrote:

"I don't think English should be required because we can speak it fine and we don't need to learn about it grammatically." Another added: "Besides when you go to apply for a job, how many employers are going to ask you what the difference between a noun and a proverb (sic) is?"

The 50 comments on mathematics were nearly unanimous in their opinion that students are not learning basic arithmetic.

"New math is fine, but the students need to know the basic facts of arithmetic," wrote one parent and another said, "I wish they would teach arithmetic instead of mathematics in the elementary school."

Students appraised their math courses more favorably than the parents and, in fact, rated science, math, advanced courses and free discussion groups exceptionally high and rated all but one curriculum area "average" to "high".

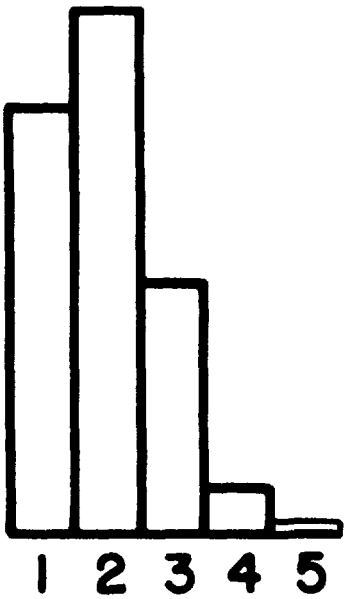
Industrial arts courses offered in junior high and high school got high ratings, but it was what is *not* offered that caught the attention of the parents. More than a third of the respondents felt there are too few vocational courses offered and 87 of them suggested the addition of more.

Most of the comments on the need for an expanded vocational program were directed at the high school level and concentrated on the need for preparing students who are not going to college. The composite feeling of those commenting seemed to be that the schools are over-emphasizing college preparation at the expense of students who are not planning to go to college.

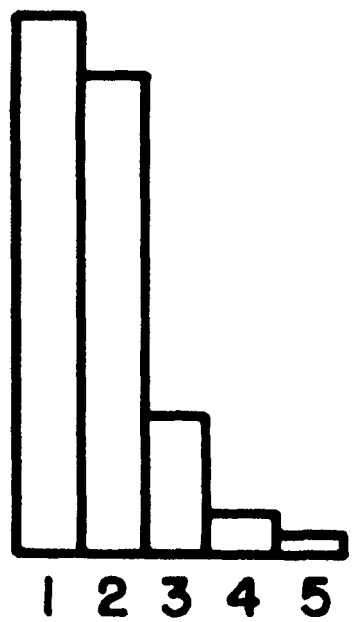
Although there were no questions specifically rating teacher quality, the committee found that parents value good teachers more highly than any other element of the school system and feel that the quality of the teaching staff determines the quality of education their children receive.

"It is difficult to answer many of

continued on next page



The graph above shows the distribution of parent's answers to the question: "How would you compare the Los Los Alamos Schools to other schools with which you are acquainted?" The graph below indicates the high school students' response to the same question.



these questions as each one depends upon the teacher. Regardless of how good the overall program is, it is the individual teacher who implements it," was among the comments.

The committee found parents want the school board to select and retain teachers who, in addition to knowing their subject, like children, care about them as individuals and are concerned that each child learn the subject matter at hand.

Most parents indicated their children receive sufficient individual attention at the elementary level but more than one third of the parents found individual attention at junior high "insufficient" and less than a third rated it "sufficient." At high school, more than a third of the parents rated it "sufficient" but almost a third rated it "insufficient."

Lack of individual attention was one of the major complaints against the system's team teaching program.

Although half the parents gave a "good" to "excellent" rating to the program, 30 per cent of the respondents rated team teaching in the direction of "quite poor." One hundred of 130 comments on the program were negative.

Complaints about team teaching varied but the most frequently criticized aspect at both elementary and secondary levels were the large classes which team teaching produces. Parents cited too much confusion, too much noise, too little knowledge by the teacher of what the individual child was doing.

"Team teaching means more teachers know the child less well," commented a parent.

Students were much less enthusiastic than parents about team teaching. Only 234 of them rated it "good" to "excellent" while 611 gave it a "poor" to "quite poor" rating. Of 117 comments received on the subject, 110 were opposed.

Students complained that classes are too large, too noisy, too undisciplined, the teachers are not properly prepared, the lectures are boring and that they do not receive enough individual attention. One student summed it up by writing, "It is too impersonal—I feel more like a sardine going through a factory than a student."

On the other hand, students were somewhat happier with modular scheduling as practiced at high school than parents were with the method on the whole. Some 549 students rated modular scheduling "good" to "excellent;" 226 didn't like it and 290 were in the middle.

Among the parents, however, modular scheduling was one of the most controversial issues in the appraisal.

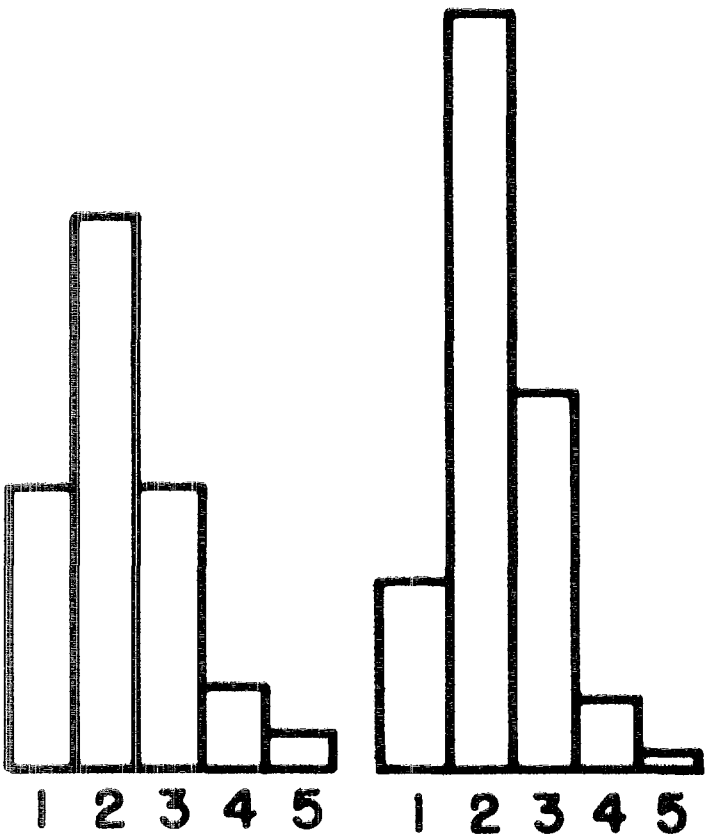
In modular scheduling the day is divided into small modules of time which can be used for instruction or free time in various combinations. Each of the secondary schools uses a different method but all three scheduling systems leave the students with varying amounts of open time. It is this unscheduled time and its use, misuse or non-use by the students which causes the major controversy.

"Good" to "excellent" ratings were given by 37 per cent, 35 per cent and 39 per cent of the respondents for Cumbres, Pueblo and the high school, respectively, but "quite poor" ratings were given by 34 per cent at Cumbres, 49 per cent at Pueblo and 29 per cent at the high school. Of 130 comments on scheduling, 100 were definitely against it.

Most common complaints were that students have too much unstructured time and there is too much confusion due to constantly changing schedules or scheduling conflicts. The commenting parents also felt their children need more supervision and should not be roaming around the halls and off the campus without the knowledge of school authorities. The comment that junior high students need more direction in their work and that they are too immature to use unstructured time profitably appeared often.

In general, parents and students expressed satisfaction with the status quo regarding the amount and quality of homework, discipline and recognition of student rights

The bar graph at right shows the distribution of parent's answers to the question: "How do your friends generally feel about the quality of Los Alamos School programs and activities?" The graph at far right indicates the distribution of answers given by the high school students to the question: "Generally, how do you think other students in the school rate the school and its program?"



and responsibilities, parent-school communication and special services. Discussion of the schools' success in achieving the goals established by the school board brought out a wide variety of opinion, not only on implementation but on whether the goals themselves are desirable. In general, parents agreed the schools are doing a good job.

One relatively weak spot noted by the appraisal was in the schools' success in motivating children to a love of learning and a willingness to work hard. One third of the parents felt students are not sufficiently motivated and more than 40 per cent of the parents of high school students felt motivation was inadequate.

Some parents also expressed grave concern that there is a school-initiated pressure to perform at a level beyond that consistent with the student's age and capabilities and that this is producing undue tension and emotional strain. About half the parents are satisfied with the pressure placed by the schools on the children to get good grades and the other half are evenly divided between those who feel there is too much and those who feel there is too little.

This concern is consistent with the oft-repeated complaint that the school system is geared to high IQ, college-bound students at the expense of the average student. Typical of the comments on this problem:

"The Los Alamos schools have a very fine program for the talented and intelligent child, but a very limited selection of courses for the average or below average child."

"How can I rate an excellent school system which makes no place for the unmotivated, less-than-brilliant student?"

Conversely, other parents made such comments as, "I feel that Los Alamos schools offer a superior education for the mediocre student, but a mediocre, even disastrous education for the superior student."

Such comments and the statistical responses to many of the questions indicated to the committee that all parents, whether their children are academically superior, average, below average or have special handicaps, expect the schools to continue to provide the education and services already existing and to improve, expand and adapt all programs to fit more closely with the special needs of the individual child. The schools, in the parents' view, should provide the best possible education for all children of every ability and interest. The parents indicate considerable satisfaction with the system on this score but can see possibilities for improvement, as one parent succinctly summed it up:

"I realize it's very difficult and expensive to develop and operate a completely objective individually oriented school system, but the system should try."

the technical side

Presentation at Seminar on Molecular Astronomy, University of Bonn and the Max-Planck Institute for Radioastronomy, Bonn, Germany, Feb. 13:

"Some Relevant Processes in Comets and Cometary Models" by W. F. Huebner, T-DO (invited)

Presentation at the Nuclear Engineering Department, University of Wisconsin, Madison, Feb. 26:

"Progress Report on Ball Lightning" by J. L. Tuck, P-DO (invited)

Presentation at seminar, Physics Department and Plasma Laboratory, Texas Technical University, Lubbock, March 5:

"Ball Lightning" by J. L. Tuck, P-DO (invited)

Presentation at the Bragg Symposium 1970—X-ray Analysis: Past, Present and Future, Royal Institute, London, England, April 1-3:

"Andenosine Triphosphate—Determination of the Structure by Direct Methods" by W.D.S. Motherwell, O. Kennard, N. W. Isaacs, J. C. Coppola, D. G. Watson, D. L. Wampler, all of the University Chemical Laboratory, Cambridge, England and A. C. Larson, CMF-5

Presentation at Conference on Applications of Chemistry to Nuclear Effects, Air Force Cambridge Research Laboratories, Bedford, Mass., April 15-16:

Chemistry Problems in Analysis of High Altitude Nuclear Test Data" by H. M. Peek, J-10

Presentation at the 51st Annual Geophysical Union Meeting, Washington, D.C., April 20-24:

"Local Time Behavior of the Alignment and Position of a SAR Arc" by N. W. Glass, J. H. Wolcott, L. W. Miller, all J-16 and M. M. Robertson, Sandia Laboratories, Albuquerque

Presentation at Sandia Laboratories Physics Colloquium, Albuquerque, April 22:

"Ball Lightning" by J. L. Tuck, P-DO (invited)

Presentation at American Physical Society Meeting, Washington, D.C., April 27-30:

"Ruthenium-106, A New Deformed Nucleus" by O. Hànsen, R. F. Casten, E. R. Flynn and T. J. Mulligan, all P-DOR, and P. Kienle, Technical University, Munich, Germany, and R. K. Sheline, Florida State University

"One and Three Quasiparticle States in Tin-121" by E. R. Flynn, O. Hansen, and T. Mulligan, all P-DOR

"Investigation of 178-Hafnium Levels" by M. M. Minor, University of Maryland, R. K. Sheline, Florida State University, and E. T. Jurney, P-2

"Propagation of Heat Pulses in Solid ^{3}He" by W. C. Overton, Jr., CMF-9

"High Explosive Generator-Driven Plasma Guns" by J. Marshall, P-17 (invited)

"Nuclear and Coulomb Pairing Energies in Light Nuclei" by R. H. Stokes, P-12, and G. E. Walker, Stanford University

"Theoretical Interpretation of Nuclear and Coulomb Pairing Energy Systematics in Light Nuclei" by G. E. Walker, Stanford University, and R. H. Stokes, P-12

"High Voltage Plasma Focus Development" by K. D. Ware, J. W. Mather, P. J. Bottoms, J. P. Carpenter and A. H. Williams, all P-7

"Line Radiation Contributions in Plasma Focus" by P. J. Bottoms, J. W. Mather, J. P. Carpenter, K. D. Ware, and A. H. Williams, all P-7

"Predictions Concerning Super-Heavy Nuclei" by J. R. Nix, T-9 (invited)

"Feedback Stabilization of a High-Beta Sharp-Boundary Stellarator" by F. L. Ribe, P-15 and M. N. Rosenbluth, Institute for Advanced Study, Princeton, N.J.

"Accurate Proton-Proton Scattering Cross Sections at 13.6 MeV" by J. H. Jett, J. L. Detch, Jr., and N. Jarmie, all P-DOR, and R. L. Hutson, MP-DOT

"Spectra of High Energy Photons From Photon Bombardment of Zinc-64" by D. M. Drake, P-DOR, S. L. Whetstone, P-9 and I. Halpern, Niels Bohr Institute, Copenhagen, Denmark and University of Washington, Seattle

"Single-Particle Levels of Deformed Nuclei in the Region $150 < A < 190$" by W. Ogle, P-2, S. Wahlborn, P-DOR, R. Piepenbring, Centre de Recherches Nucleaires, Strasbourg, France, and S. Fredricksson, Royal Institute of Technology, Stockholm, Sweden

"Neutron-Alpha Particle Elastic Scattering Near 20 Million-Electron-Volts" by A. Niiler, M. Drosg, J. C. Hopkins, all P-DOR, and R. K. Walter, EG&G

"Spontaneous Fission Isomers of Plutonium" by W. E. Stein, H. C. Britt, both P-DOR, S. C. Burnett, formerly P-DOR, and B. H. Erkkila, P-12

"Thickness of the Static and Moving HE II Film" by W. E. Keller, CMF-9

"Analysis of Plutonium-238 Fission Cross Section" by T. E. Young, Idaho Nuclear Corporation, and M. G. Silbert, P-DOR

"Decay of the ^{178} Lu Isomers and the New Isotope ^{178}Yb" by C. J. Orth, W. R. Daniels, Francine O. Lawrence and Darleane C. Hoffman, all J-11

"A High Temperature Radiation Field, Fast Response Viscometer Furnace" by F. A. Guevara, M. Goldblatt, B. B. McInteer, R. M. Potter and W. E. Wageman, all CMF-4

"Quantitative Non-Linearity Corrections for Differential Pressure Transducers" by W. E. Wageman, B. B. McInteer and F. A. Guevara, all CMF-4

"An Experiment to Measure the Off-Shell Pion Plus Omega Meson

Yields Pion Plus Pion Scattering" by Fumiyo Uchiyama-Campbell, T-9

Presentation at the National Center for Radiological Health, Rockville, Md., April 28:

"Air Sampling and Respiratory Protection" by H. F. Schulte, H-5

Presentation at the American Nuclear Society's National Topical Meeting on Aerospace Nuclear Applications, Huntsville, Ala., April 28-30:

"Thermionic Reactors" by G. M. Grover, N-5

"Watch Out For That Tree!" by R. E. Schreiber, Dir. Off.

"Nuclear Electromagnetic Propulsion" by T. F. Stratton, N-5 (invited)

"Advanced Nuclear Rocket Technology" by W. L. Kirk, N-DO

"Protection Guides for Combined Space and Nuclear Radiation Exposure" by W. H. Langham, H-4 (invited)

Presentation at Colloquium, University of California, San Diego, April 29:

"Los Alamos Meson Factory. Construction Progress and Future Applications to Particle Physics, Nuclear Structure, Nuclear Chemistry, and Cancer Therapy" by D. E. Nagle, MP-DO (invited)

Presentation at Joint Meeting of the Division of High Energy Astrophysics of the American Astrophysical Society and Division of Cosmic Physics of the American Physical Society, Washington, D. C. April 29-May 1:

"Power Spectrum of 3C 273 Fluctuations" by N. J. Terrell, P-DOR and K. H. Olsen, J-15

Presentation at the Semi-Annual AEC Computer Information Meeting, Washington, D. C., April 30-May 1:

"Computers and Weapons Development" by R. B. Lazarus, C-DO

Presentation at a joint seminar, Carnegie-Mellon University and the University of Pittsburg, Pa., May 1:

"On the Discrepancy Between Soft Pion Predictions and Experiment in Pion Production in Nucleon-Nucleon Collisions" by R. R. Silbar, T-9 and M. E. Schillaci, MP-DO

Presentation at seminar, Cornell University, Ithaca, N.Y., May 1:

"Low Temperature Nuclear Physics" by J. R. Sites, CMF-9

Presentation at seminar at University of Minnesota, Minneapolis, May 1:

"Solid State, Nuclear Structure, and Symmetry Studies Using Aligned Nuclei" by W. A. Steyert, CMF-9

Presentation at the Physics Department, Florida State University, Tallahassee, May 1:

"Energy Levels of Non-Spherical Nuclei in the Rare-Earth Region" by S. Wahlborn, P-DOR

Presentation at the 72nd Annual Meeting of the Nuclear Division of the American Ceramics Society, Philadelphia, Pa., May 2-7:

"Characterization of Commercial Carbide Powders for Nuclear Applications" by R. E. Riley and J. E. Magnuson, both CMB-6 and T. G. Gregory, GMX-1

"Strain Effects and Spalling in Alpha-Bombarded ThO_2" by F. W. Clinard, Jr., D. L. Douglass and C. C. Land, all CMF-5

Presentation at Argonne National Laboratory, Chicago, Ill., May 4-5:

"Recent Developments in Numerical Transport Theory" by B. G. Carlson, T-1 (invited)

Presentation at the Association for Computing Machinery Symposium on Theory of Computing, Northhampton, Mass., May 4-6:

"A Result on the Relationship Between Simple Precedence Languages and Reducing Transition Languages" by J. B. Morris, Jr., C-7

Presentation at seminar at Consiglio Nazionale Delle Ricerche, University of Rome, Italy, May 5:

"Observations and Theoretical Models of the Solar Wind" by A. J. Hundhausen, T-12 (invited)

Presentation at Eastern Area Research and Development Safety Symposium, Cambridge, Mass., May 5:

"Cryogenic Safety Fundamentals" by R. Reider, H-3

Presentation at the Biometric Section of the Joint Statistical Meeting, University of North Carolina, Chapel Hill, May 5-7:

"A Two Sample Test of Coefficients of Variation and of Means Assuming Homogeneous Coefficients of Variation" by R. K. Lohrding, C-5

Presentation at seminar at European Space Research Institute, Frascatti, Italy, May 6:

"Solar Wind Chemical Composition" by A. J. Hundhausen, T-12 (invited)

Presentation at Sandia Corporation Seminar, Albuquerque, May 6:

"Combined Space and Nuclear Radiation Effects" by W. H. Langham, H-4 (invited)

Presentation at Spring Meeting of the American Society of Civil Engineers, New Mexico Section, Los Alamos, May 7-9:

"Construction of LAMPF Facilities or the Challenge of Housing an Invention" by P. D. Edwards, MP-5 (invited)

"Stress Problems in Nuclear Structures" by R. I. Brasier, ENG-DO

"Computer Aided Structural Analysis" by L. H. Baker, ENG-DO

Presentation at the Fourth International Conference on Beam Science and Technology, Electrochemical Society, Los Angeles, Calif., May 10-15:

"The Relationship of Beam Parameters to Weld Geometry in Electron Beam Welds" by D. J. Sandstrom, CMB-6 (invited)

Presentation at seminar at National Institutes of Health, Bethesda, Maryland, May 11:

"Potential Clinical Applications of Carbon-13" by C. T. Gregg, H-4 and N. A. Matwiyoff, CMF-4 (invited)

Presentation at the Spring Meeting of the Rio Grande Chapter of the Association for Computing Machinery, Scottsdale, Ariz., May 11:

continued on next page

"MUX—A Simple Approach to On-Line Computing" by R. D. Christman, C-2

"A New Technique for Solving Convolution-Type Integral Equations by Use of the Fast Fourier Transform" by B. R. Hunt, C-5

Presentation at the Annual American Industrial Hygiene Association Meeting, Detroit, Mich., May 11-15:

"Comparison of Filter Media Against Liquid and Solid Test Aerosols" by R. G. Stafford and H. J. Ettinger, both H-5

"Calibration of a Cyclone Two Stage Air Sampler" by H. J. Ettinger and G. W. Royer, both H-5

Presentation at International Symposium on Solar-Terrestrial Physics 1970, Leningrad, USSR, May 11-20:

"Composition and Dynamics of the Solar Wind Plasma" by A. J. Hundhausen, T-12 (invited)

"Plasma Sheet Variations During Magnetospheric Substorms" by E. W. Hones, Jr., S. Singer and S. J. Bame, all P-4

Presentation at the Spring Meeting of the American Institute of Metallurgical Engineers, Las Vegas, Nev., May 12:

"Yield Surfaces in Prestrained Aluminum and Copper" by S. S. Hecker, CMF-5

Presentation at seminar, University of Virginia, Charlottesville, May 13:

"The Inner Region of the Cometary Coma" by W. F. Huebner, T-DO

Presentation at the National Symposium on High-Temperature Plasma Diagnostics, Sukhumi, USSR, May 13-21:

"Laser Interferometry: (A) Holographic and (B) Coupled-Cavity" by F. C. Jahoda, P-15 (invited)

Presentation at colloquium, Purdue University, Lafayette, Ind., May 13, and at colloquium, University of Illinois, Urbana, May 14:

"Production of Pions From 750-MeV Protons on Nuclei" by D. E. Nagle, MP-DO

Presentation at the 1970 Spring Meeting of the Acoustic Emission Working Group, Las Vegas, Nev., May 14-15:

"The Acoustic Emission Behaviour Resulting From the Martensitic Phase Change in the Gold-Cadmium System" by T. H. Feiertag, and D. R. Schuyler, both GMX-1

Presentation at Conference on Computational Methods in Band Theory, IBM Watson Research Center, Yorktown Heights, N.Y., May 14-15:

"Crystal Potentials Used in Energy Band Theory" by E. C. Snow and A. M. Boring, both CMF-5

"A Potential Function for Band Structure Calculations" by D. A. Liberman, T-4

"Calculations of Energy Gradients From the APW Determinant" by J. H. Wood, CMF-5

Presentation at the 84th Annual Meeting of the New Mexico Medical Society, Santa Fe, May 15:

"The Los Alamos Meson Physics Facility and the Physical Properties of Negative Pions" by L. Rosen, MP-DO (invited)

Presentation at Meeting of the Society of Industrial Photographers, Albuquerque, N.M., May 15:

"Color Motion Pictures by Computers" by D. O. Dickman, C-4

Presentation at Air Force Materials Symposium—1970, Miami Beach, Fla., May 18-22:

"Materials Properties and Equation of State" by J. W. Taylor, GMX-6

Presentation at Mathematics Colloquium, University of New Mexico, Albuquerque, May 19:

"On Secondary Bifurcation of Eigensolution Branches with Hammerstein's Operator" by G. H. Pimbley, Jr., T-8

Presentation at Third International Conference on Magnet Technology, Hamburg, Germany, May 19-22:

"A Superconducting Quadrupole Doublet for LAMPF Secondary Beam Lines" by W. V. Hassenzahl, MP-6 and H. L. Laquer, J. K. Novak, J. D. Rogers and R. W. Stokes, all CMF-9

"Effects of an Intense Flux of Fast and Slow Neutrons on the Magnetic Properties of Steel" by H. Vogel, MP-6

"Perturbations from Steel Environment Close to a C-Magnet" by H. Vogel, MP-6

"Radiation Damage in Nb-Ti Superconducting Wires" by W. V. Hassenzahl, MP-6 and J. D. Rogers, H. L. Laquer and W. C. Armstrong, all CMF-9

Presentation at Colloquium on Dense Plasma Focus and Other Related Subjects, Auburn University, Auburn, Ala., May 22:

"Dense Plasma Focus" by J. W. Mather, P-7 (invited)

Presentation at Joint American Chemical Society-Chemical Institute of Canada Meeting, Toronto, Canada, May 24-29:

"Carbon-13 NMR Studies of Substituted Amino-Acid and Ethylenediamine Complexes of Nickel(II)" by N. A. Matwiyoff, CMF-4

Presentation at Stanford University, May 25, and at the University of California, Los Angeles, May 26:

"Finite Difference Methods in the Numerical Solution of the Transport Equation" by K. D. Lathrop, T-1

Presentation at seminar, Wayne State University, Detroit, Mich., May 25:

"Carbon-13 NMR Studies" by N. Matwiyoff, CMF-4 (invited)

Presentation at seminar at the Ioffe Physico-Technical Institute, Leningrad, USSR, May 25:

"Plasma Physics at Los Alamos" by F. C. Jahoda, P-15

Presentation at Symposium on Progress in Gas Dynamic Research Methods, Syracuse University, N.Y., May 25-26:

"Pulse Laser Holographic Interferometry" by F. C. Jahoda, P-15 (presented by R. E. Siemon, P-15, for Jahoda)

Presentation at 11th Annual Meeting of the Institute of Nuclear Materials Management, Gatlinburg, Tenn., May 25-27:

"Neutron Interrogation Techniques for Fissionable Material Assay" by

R. H. Augustson, L. V. East, A. E. Evans and G. R. Keepin, all N-6

"The Los Alamos Mobile Nondestructive Assay Laboratory" by J. H. Menzel, M. M. Thorpe, R. B. Walton, D. B. Smith, G. R. Keepin, all N-6 and B. R. Dennis, ENG-6

Presentation at Physics Department seminar, California Institute of Technology, Pasadena, May 28:

"The Los Alamos Meson Facility" by L. Rosen, MP-DO (invited)

Presentation at the Sixth International Conference on Nondestructive Testing, Hannover, Germany, June 1-5:

"The International Committee for Nondestructive Testing, Past and Future" by G. H. Tenney, Dir Off

"Nondestructive Evaluation, A Review of a Report of the National Materials Advisory Board of the U.S.A." by G. H. Tenney, Dir. Off.

Presentation at Short Course for Industrial Applications of Nuclear Explosives, Department of Engineering, University of New Mexico, Albuquerque, June 2-3:

"Production and Decay of Radioactivity in Contained Nuclear Explosions" by R. L. Aamodt, J-DO

"Project Rulison" by R. L. Aamodt, J-DO

Presentation at American Statistical Association Meeting, Los Angeles, Calif., June 5:

"Statistical Considerations in the Selection of a Desk-Top Calculator with "Saveable Programs" by G. L. Tietjen, C-5

Presentation at Second International Conference on Beam-Foil Spectroscopy, Lysekil, Sweden, June 7-12:

"Spectral Linewidth Limitations Set by Ion-Foil Interactions" by J. O. Stoner, Jr., University of Arizona, Tucson and L. J. Radziemski, CMB-1 (invited)

Presentation at 51st Annual Meeting of the American Welding Society, Cleveland, Ohio, June 8-12:

"On the Measurement and Interpretation and Application of Parameters Important to Electron Beam Welding" by D. J. Sandstrom and G. S. Hanks, both CMB-6 and J. F. Buchen, CMB-7

Presentation at the 132nd Meeting of the American Astronomical Society, Boulder, Colo., June 9-12:

"Airborne Infrared Observations of the March 7, 1970 Total Solar Eclipse" by K. H. Olsen and C. R. Anderson, both J-15

"A Near Infrared Fourier Transform Spectrometer for Airborne Solar Eclipse and Stellar Observations" by C. R. Anderson and K. H. Olsen, both J-15

"Transfer Effects in a Cepheid Atmosphere" by C. G. Davis, Jr. and Janet E. Bendt, both J-15

"Solar X-Ray Monitoring by the Vela V and VI Satellites" by N. K. Blocker, W. H. Chambers, P. E. Fehlau, J. C. Fuller, W. E. Kunz and R. W. Milkey, all W-7

"Pulsational Characteristics of Forbes' Mass-Loss Models" by E. M. Jones, J-10

"Correlation of Optical and X-Ray Emission from SCO XR-1" by J. P. Conner, W. D. Evans, R. D. Belian, all P-4 and W. E. Kunkel, Cerro Tololo Inter-American Observatory, Chile and W. A. Hiltner, Yerkes Observatory, University of Chicago, Williams Bay, Wis.

"Airborne Telescope for Video Recorded Coronal Spectroscopy of the March 7, 1970 Total Solar Eclipse" by M. Hoffman, J-12, E. A. Brown, N-14 and D. H. Liebenberg, CMF-9

"Airborne Photography of the Solar Corona During the March 1970 Eclipse" by C. F. Keller, J-15, B. Strait, C-8, O. Winslow, GMX-8 and L. Rice, J-7

continued on next page

what's doing

OUTDOOR ASSOCIATION: No charge, open to the public. Contact leaders for information regarding specific hikes.
- July 15—evening hike, Norris Nereson, 662-3839
- Aug. 15—evening hike, Dorothy Hoard, 672-3356
- Aug. 22—Lake Peak, Walter Green, 672-3203
- Aug. 29—bike hike, Ted Norris, 662-3466

RIO GRANDE RIVER RUNNERS: Meetings scheduled for noon, second Tuesday of each month at South Mesa Cafeteria. For information call Cecil Carnes, 672-3239.

MOUNTAIN MIXERS SQUARE DANCE CLUB: For information call Mrs. Joyce Headdy, 672-3738.
- July 25—catered barbeque and dance, Pinon Park. Harry (Bones) Craig, caller
- Aug. 1—weekend at Fun Valley, Colo.
- Aug. 15—Pinon Park, Harry (Bones) Craig, caller

PUBLIC SWIMMING: High School Pool—Monday through Friday, 1 to 5 p.m. and 7 to 10 p.m.; Saturday and Sunday, 1 to 6 p.m.; Adult Swim Club, Sunday, 7 to 9 p.m. (schedule through Aug. 16)

LOS ALAMOS FILM SOCIETY:
- July 26—"Le Bonheur"
- Aug. 26—"Seance on a Wet Afternoon"

Civic Auditorium, 7:30 p.m.; admission: members—$.75, others—$2.

SIERRA CLUB: Luncheon meeting at noon, first Tuesday of each month, South Mesa Cafeteria. For information call Brant Calkin, 455-2468, Santa Fe.

MESA PUBLIC LIBRARY:
- Through Aug 17—Apollo Exhibit
- Through Aug. 17—Antique Bottle Exhibit
- Through July 23—photographs, Anne Huggins
- July 24 to July 30—new mesa prints (circulating print exhibit)
- July 30 to Aug. 17—paintings, Mark Wackerle
- Aug. 17 through Sept. 9—Exhibit by Zero Population Growth
- Aug. 18 through Sept. 9—League of Women Voters 50th Anniversary Exhibit
- Aug. 19 to Sept. 9—paintings, Maria Riley

SANTA FE OPERA: Box Office open in Los Alamos Building and Loan, Monday, Wednesday, and Thursday, 10 a.m. to 1 p.m. All performances begin at 9 p.m. For information call Mrs. Beth Motz, 662-4994.
- July 17—"Le Rossignol" and "The Globolinks"
- July 18—"The Marriage of Figaro"
- July 22—"The Marriage of Figaro"
- July 24—"Le Rossignol" and "The Globolinks"
- July 25—"Anna Bolena"
- July 29—"Le Rossignol" and "The Globolinks"
- July 31—"Anna Bolena"
- Aug. 1—"The Marriage of Figaro"
- Aug. 5—"Anna Bolena"
- Aug. 7—"The Rake's Progress"
- Aug. 8—"La Traviata"
- Aug. 12—"Opera" (World Premiere)
- Aug. 13—"The Rake's Progress"
- Aug. 14—"Opera"
- Aug. 15—"The Marriage of Figaro"
- Aug. 19—"La Traviata"
- Aug. 20—"Anna Bolena"
- Aug. 21—"The Marriage of Figaro"
- Aug. 22—"La Traviata"

LOS ALAMOS ARTS COUNCIL: Arts Festival, Aug. 6-9. Activities include folk music, storyhour, variety shows, films, concerts and magic show. For information call Mrs. Marie Filip, 662-2135.

LOS ALAMOS COUNTY FAIR: Aug. 16-23. Includes horse show, exhibits, parade, junior rodeo and dances. Theme—"Southwestern Scenes;" Parade Marshall: Norris E. Bradbury

Presentation at the Second Thermal Expansion Symposium, Santa Fe, N.M., June 10-12:

"The Thermal Expansion of Extruded Graphite-ZrC Carbide Composites" by L. R. Cowder, and L. L. Lyon, both N-1 and R. W. Zocher, Oak Ridge National Laboratory and J. F. Kerrisk, CMB-11

"Thermal Expansion and Phase Equilibria of the Carbon Saturated Plutonium Carbides" by J. L. Green and J. A. Leary, both CMB-11

"The Role of Thermal Expansion Measurements in the Experimental Graphite Program" by P. Wagner, CMF-13

"A Note on the Stress Dependence of the Thermal Expansion Coefficient" by A. E. Carden, University of Alabama, Tuscaloosa and J. C. Rowley, N-7

"Anisotropic Thermal Expansion of Refractory Carbides by High Temperature Neutron Diffraction" by A. L. Bowman and N. H. Krikorian, both CMB-3 and G. P. Arnold, P-2

Presentation at 1970 Heat Transfer and Fluid Mechanics Institute, Naval Postgraduate School, Monterey, Calif., June 10-12:

"The Calculation of Steady Turbulent Flows in Two Dimensions" by S. E. Ziemniak, formerly N-7

Presentation at Meeting on Low Energy X and Gamma Ray Sources and Applications, Boston, Mass., June 10-12:

"An Energy-Flux Meter for 1 to 10 Å X Rays" by J. H. McCrary, EG&G, Inc., Las Vegas, and P. B. Lyons and J. A. Baran, both J-14

Presentation to Research and Development Section, Rocky Flats Division, Dow Chemical Company, Golden, Colo., June 12:

"Some Chemical Research in Progress at Los Alamos" by C. E. Holley, Jr., CMF-2 (invited)

Presentation at the Department of Agricultural Chemistry, Oregon State University, Corvallis, June 12:

"The LASL Hippies—A Progress Report" by C. T. Gregg, H-4 (invited)

Culled from the July-August, 1950, files of the Los Alamos News by Robert Porton

Hold on to Your Pass

The loss of one's pass is punishable by being yanked off to a lecture and movie on "security." Upon the loss of a pass a second time, one must hear the lecture again. Judging from the facial expressions of victims, they seem to be making mental resolutions to have the darned thing taped on their person.

Emergency Plans are being Up-Dated

Up-dated plans for handling emergencies, disasters and civil defense in this community will be ready for practice tests in the near future. The Emergency and Disaster committee, headed by J. R. Maddy, AEC director of safety and fire protection, has been formed. A master plan has been prepared which reorganizes the Central and Field Control groups and outlines emergency activities for the Laboratory, Zia, hospital, schools, police and fire departments.

People Speculate on "Open City"

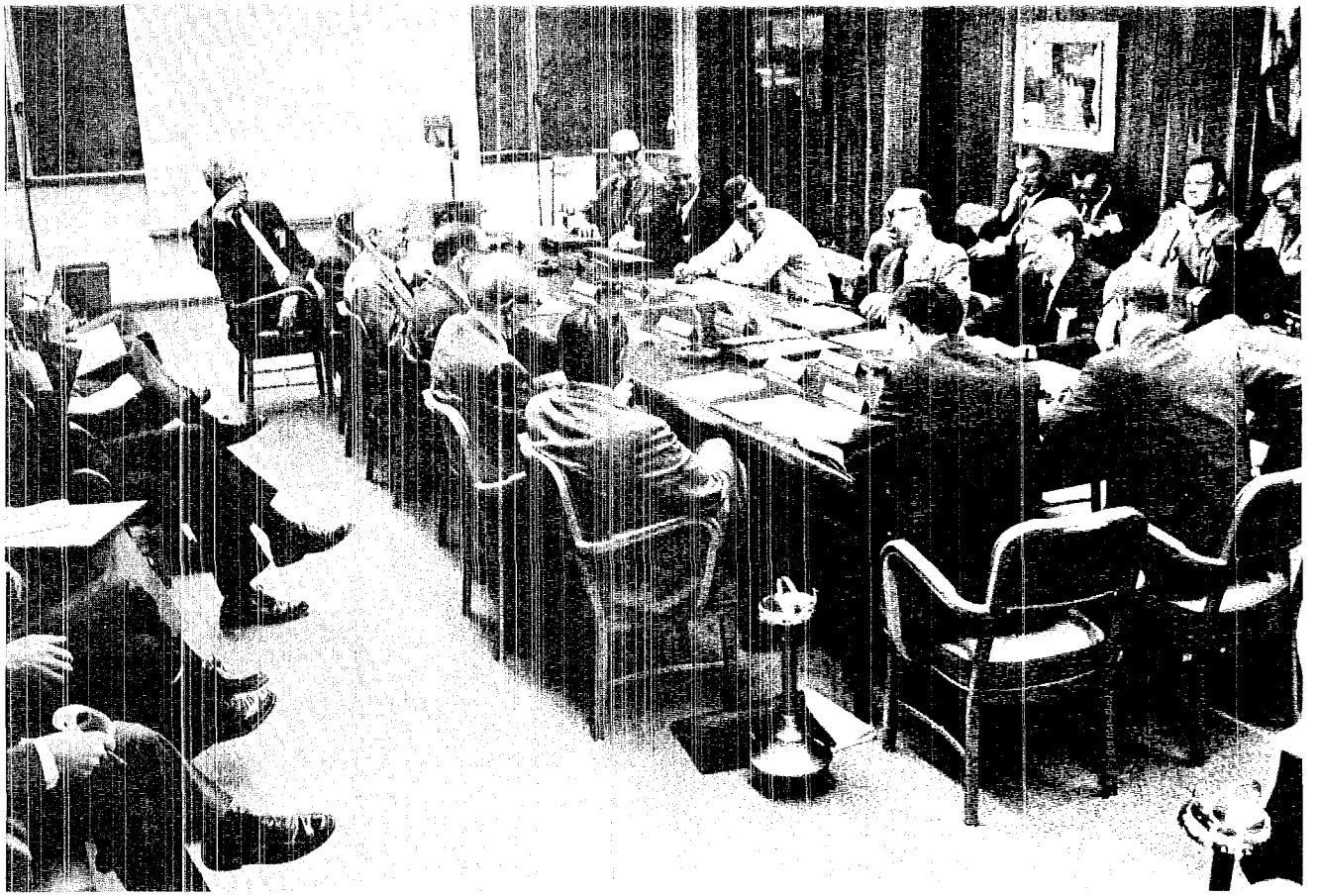
The Atomic Energy Commission's decision to pull the government out of the municipal affairs of Los Alamos, Hanford, Washington and Oak Ridge, Tennessee, and possibly selling residential and business properties to private citizens, is the "talk of the town." Speculation is high among residents and concessionaires about the possible influx of curiosity seekers and competitive businesses when Los Alamos becomes an "open city." It is thought that such a move will not take place for at least several years. However, when that time comes, it would mean that the Hill's 10,800 people would be living in a "normal" American city.

Laboratory Sets New Safety Record

Los Alamos Scientific Laboratory employees have set a new safety record by working more than a million man hours without a single disabling industrial injury. This record, extending over 75 days, covers the longest period in the Laboratory's history that no accidents have been incurred.

Bradbury Named Physics Professor

The University of California has announced the appointment of Norris E. Bradbury as a professor of physics. Bradbury has been director of Los Alamos Scientific Laboratory since 1945.



Members of the Atomic Energy Commission's Plowshare Advisory committee held their 20th meeting in June at the Los Alamos Scientific Laboratory. Plowshare is the AEC's program to investigate and develop peaceful uses for nuclear explosions. Presenting a report to the committee is Brigadier General K. E. Fields (retired), of the Atlantic-Pacific Interoceanic Canal Study Commission, fourth from right on far side of table. To his right are committee members Dr. Louis H. Hempelmann of the School of Medicine and Dentistry, University of Rochester, N.Y.; Willard Bascom, president of Ocean Science and Engineering, Inc., Long Beach, Calif.; and Willard F. Libby of the University of California's Chemistry department, Los Angeles, Calif.; To Fields' left are Carl R. Gerber, assistant secretary of the committee, Washington, D.C.; John S. Kelly, committee secretary, Washington, D.C.; and Spofford G. English, committee chairman. On the near side of the table, from left to right, are Lieutenant General Alfred D. Starbird, Sentinel System manager, Arlington, Va.; Lieutenant General James H. Doolittle (retired), Los Angeles, Calif.; Donald H. McLaughlin, chairman of the board, Homestake Mining Company, San Francisco, Calif.; Dr. Paul B. Sears, Las Milpas, Taos, N.M.; Dr. Phillip C. Rutledge, a partner in Mueser, Rutledge, Wentworth & Johnson, New York City; and Hymer L. Friedell, Western Reserve University, Cleveland, Ohio.

Film Star Kirk Douglas and his son Peter recently toured Sherwood facilities, the Health Research Laboratory and the Science Museum and Exhibit Hall at the Los Alamos Scientific Laboratory. They were accompanied by Mr. and Mrs. Ralph Cooper of Los Alamos. Mrs. Cooper is at left in this photograph. Carl Cuntz, PUB-2, right, shows Douglas and his son through the Science Museum and Exhibit Hall.